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In the Supreme Court of the United States

OCTOBER TERM, 1978

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION and DEPARTMENT OF TRANSPORTATION, PETITIONERS

v.

PACCAR, INC., ET AL.

PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

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The Solicitor General, on behalf of the National Highway Traffic Safety Administration and the Department of Transportation, petitions for a writ of certiorari to review the judgment of the United States Court of Appeals for the Ninth Circuit in this case.

OPINION BELOW

The opinion of the court of appeals (App. A, *infra*, pp. 1a-32a) is reported at 573 F.2d 632.

JURISDICTION

The judgment of the court of appeals (App. B, *infra*, p. 33a) was entered on April 17, 1978. The jurisdiction of this Court is invoked under 28 U.S.C. 1254(1).

QUESTIONS PRESENTED

1. Whether the National Highway Traffic Safety Administration (NHTSA) acted arbitrarily or capriciously in determining that its performance standard for air-braked trucks was "practicable" at the time of its promulgation or at the time of its subsequent implementation.

2. Whether NHTSA must conduct independent tests to "assure" the reliability of equipment designed by manufacturers to meet safety performance standards.

STATUTES AND REGULATIONS INVOLVED

The relevant provisions of the National Highway Traffic and Motor Vehicle Safety Act of 1966, 80 Stat. 718, as amended, 15 U.S.C. 1381 *et seq.*, are reproduced in App. C, *infra*, pp. 34a-43a.

Federal Motor Vehicle Safety Standard No. 121, 49 C.F.R. 571.121 *et seq.*, as amended to the date the court of appeals took this case under submission, is reproduced in App. D, *infra*, pp. 44a-74a.

STATEMENT

Federal Motor Vehicle Safety Standard No. 121 ("the Standard"), which became effective for tractor-trailers on January 1, 1975, and for trucks and buses on March 1, 1975, establishes safety performance requirements, including braking-distance limitations, for air-braked vehicles. This case involves the braking-distance limitations and testing requirements established by the Standard.

1. The National Traffic and Motor Vehicle Safety Act of 1966, 80 Stat. 718, as amended, 15 U.S.C. 1381 *et seq.* (the "Safety Act"), is designed "to reduce traffic accidents and deaths and injuries to persons resulting from traffic accidents" (15 U.S.C. 1381). It authorizes the Secretary of Transportation to establish mandatory safety standards applicable to all motor vehicles.[1] Safety standards "shall be practicable, shall meet the need for motor vehicle safety, and shall be stated in objective terms." 15 U.S.C. 1392(a). In issuing safety standards, the Secretary must give consideration to "relevant available motor vehicle safety data, including the results of research, development, testing and evaluation activities * * *." 15 U.S.C. 1392(f)(1). "[S]afety shall be the overriding consideration" in adopting each standard. S. Rep. No. 1301, 89th Cong., 2d Sess. 6 (1966); see H.R. Rep. No. 1776, 89th Cong., 2d Sess. 16 (1966).

New safety standards shall not take effect sooner than 180 days after promulgation, or later than one year after promulgation, "unless the Secretary finds, for good cause shown, that an earlier or later effective

[1] The Secretary delegated these powers to the Administrator of NHTSA (49 C.F.R. 1.50(a)).

date is in the public interest * * *." 15 U.S.C. 1392 (c). Once a motor vehicle safety standard has become effective, every manufacturer or distributor of vehicles or equipment subject to the standard must certify that its vehicles or equipment conform to the standard. 15 U.S.C. 1403. The manufacture or sale of vehicles or equipment not in compliance with the standard is prohibited. 15 U.S.C. 1397(a)(1)(A).

2. NHTSA's predecessor agency published notice on October 14, 1967, that it was considering the adoption of safety standards for trucks, buses, trailers, and similar heavy vehicles (32 Fed. Reg. 14278). After evaluating the comments received in response to this proposal and reviewing the results of the several studies performed for the agency by independent research organizations, the agency concluded that heavy, air-braked vehicles were disproportionately responsible for fatal and other serious highway accidents.

The agency's investigation indicated that the most significant causes of these excessive serious accidents were the substantially inferior braking and control of these vehicles during stopping and turning maneuvers (see 41 Fed. Reg. 8784 (1976)). The agency found that existing air-brake systems in heavy vehicles were inadequate to stop the vehicles in relatively short distances at typical highway speeds, and also caused wheel "lockup" and resultant loss of directional control (*ibid.*).[2] The agency then consulted

[2] The agency awarded a research contract in 1969 to the Highway Safety Research Institute of the University of Michigan to determine whether existing air-brake systems could be improved with respect to stopping distances and "lockup." The Institute undertook a comprehensive study of heavy vehicle brake performance (referred to in the record as the "Murphy Report") and concluded that "the braking performance of buses, trucks and tractor-trailers * * * is, on the average, less than that for passenger cars and certainly less than the maximum performance achievable" (Murphy Report 1). It stressed that "[p]revention of wheel lockup appears to be the greatest deterrent" to vehicle instability during braking (*id.* at 17). Accordingly, it recommended more effective brakes, to reduce the disparity between the stopping capabilities of air-braked vehicles and passenger vehicles, and the installation of equipment to prevent wheel lockup (*id.* at 3-4).

with representatives of the heavy vehicle manufacturing industry, and with an "outside task force" of experts on heavy vehicle manufacture and use; these sources reported that the technology was available to shorten stopping distances and reduce wheel lockup on heavy vehicles (see 41 Fed. Reg. 8785).

On June 25, 1970, after three years of research, study, and evaluation, the agency proposed a new motor vehicle safety standard "to establish requirements for air brake systems on trucks and buses" (35 Fed. Reg. 10368). In light of congressional instructions that motor vehicle safety standards "are expected to be performance standards, specifying the required minimum safe performance of vehicles but not the manner in which the manufacturer is to achieve the specified performance" (S. Rep. No. 1301, 89th Cong., 2d Sess. 6 (1966)), the agency proposed a braking-distance performance standard and gave manufacturers a free hand in selecting and develop-

ing equipment to meet the standard. The proposed standard fixed maximum stopping distances for vehicles at different speeds and on specified dry and wet pavement surfaces, and it required that vehicles be able to stop in a straight line without locking their wheels (36 Fed. Reg. 3817, 3819-3820 (1971)). The proposed standard was adopted by NHTSA on February 27, 1971, with an effective date of January 1, 1973 (36 Fed. Reg. 3817).

Most manufacturers reacted to the Standard by installing stronger braking systems. They sought to make the new, stronger brakes operate efficiently and without lockup by installing "antilock" devices in the vehicles. The antilock device "consists of a minicomputer attached to each axle of the truck or tractor-trailer which 'senses' when a wheel begins to lock and momentarily releases the brake to regain traction" (App. A, *infra*, p. 9a). These devices were already in use on some passenger cars and on aircraft (*id.* at 19a). Because some manufacturers were concerned that the antilock devices themselves might present safety problems, NHTSA collected and analyzed test data from antilock manufacturers; these data showed that the devices had been rigorously examined and presented no safety problems (see 39 Fed. Reg. 39881 (1974)).

On November 12, 1974, after twice delaying implementation of the Standard to permit further study of antilock devices,[3] NHTSA declared that the Stand-

[3] As manufacturers began to design and produce complying air-brake systems, NHTSA monitored their efforts and re-

ard's key provisions were final for purposes of judicial review (39 Fed. Reg. 39880). NHTSA pointed out that its engineering staff had monitored antilock production and testing to determine that the devices were available and reliable, and that proprietary data it had received from manufacturers showed "millions of axle miles of antilock operation with a malfunction rate comparable to other equipment presently in highway service, and no highway accidents attributable to the device" (*id.* at 39881).

3. On January 3, 1975, respondent Paccar, Inc., a truck manufacturer, filed a petition for judicial review of the Standard.[4] During the pendency of the review proceeding, additional evidence bearing on the practicability of antilock devices was submitted to NHTSA in the form of petitions for modification or

sponded to the problems they encountered. Thus, to "permit a longer period of fleet testing to evaluate the durability of the new systems" (37 Fed. Reg. 3907 (1972)), NHTSA postponed the scheduled effective date first to September 1, 1974, for all vehicles (37 Fed. Reg. 3905) and then to January 1, 1975, for trailers and March 1, 1975, for trucks and buses (39 Fed. Reg. 804; 39 Fed. Reg. 7966; 39 Fed. Reg. 17563; 39 Fed. Reg. 28161 (1974)).

[4] Respondent Truck Equipment & Body Distributors Association, Inc. ("TEBDA"), an organization representing manufacturers who modify truck chassis to produce dump trucks, cement trucks, garbage trucks, and other special purpose vehicles, filed a petition for judicial review in the United States Court of Appeals for the Sixth Circuit. A third petition for judicial review was filed by respondent American Trucking Associations, Inc. ("ATA") in the District of Columbia Circuit. These petitions were transferred to the Ninth Circuit and consolidated for review.

amendment of the Standard pursuant to 15 U.S.C. 1392(e). Paccar asked the court of appeals to issue an order that this additional evidence be identified as part of the record in this case. The court ordered NHTSA periodically to supplement the record with (1) all additional data received by the agency in applications for amendment of the Standard,[5] and (2)

[5] A petition for review ordinarily confers jurisdiction on the court of appeals only for the purpose of determining the validity of the order specifically challenged in the petition, and such review is to be limited to the record relied on by the agency in issuing the challenged order. See 28 U.S.C. 2112; *Securities & Exchange Commission* v. *Chenery Corp.*, 318 U.S. 80, 87; *Tagg Bros. & Moorhead* v. *United States*, 280 U.S. 420, 444; *Doraiswamy* v. *Secretary of Labor*, 555 F.2d 832, 839-841 (C.A.D.C.); see also Fed. R. App. P. 15(a), 16. The provisions for judicial review under the Safety Act, however, are somewhat more expansive. In recognition of the practical difficulties that may be encountered (and evidence that may be developed) between the initial promulgation and the delayed implementation of federal safety standards (see 15 U.S.C. 1392(c)), Congress provided that a petitioner seeking review of a safety standard may apply to the reviewing court for leave to introduce new evidence into the record that was not reasonably available for submission in the proceeding before the agency. 15 U.S.C. 1394(a)(2). On receipt of such an application, the court may direct the agency to consider the new evidence and make such responsive findings or recommendations as the agency deems appropriate. The agency's findings, along with the additional evidence, are then to be returned to the court for inclusion in the record for judicial review (*ibid.*). See *H & H Tire Co.* v. *United States Department of Transportation*, 471 F.2d 350, 353 n. 10 (C.A. 7).

As a result of the application of this provision in this case, the court received, as part of the record to be reviewed, post-promulgation evidence of antilock equipment failures and the findings made by the agency in response to this evidence. Although we do not believe that the court of appeals should have ordered NHTSA to provide it with every new document it received, we do not contend that the evidence actually submitted could not have been received by the court under appropriately limited orders pursuant to 15 U.S.C. 1394(a)(2). Accordingly, the agency's post-promulgation findings, as well as the initial decision to promulgate the challenged safety standard, were properly before the court of appeals in this case.

the agency's response to such data.

In December 1975 NHTSA requested the court to defer consideration of the petition for review until the agency had amended the Standard to reflect the agency's evaluation of the post-promulgation evidence of antilock equipment performance. The court postponed the oral argument in response to the agency's request.[6]

In its review of the post-promulgation evidence presented by some manufacturers about the difficulties that had been confronted in implementing the brak-

[6] The court of appeals also entered an order staying the effectiveness of the Standard for an indefinite period. The stay was vacated by Mr. Justice Rehnquist. *Coleman* v. *Paccar, Inc.*, 424 U.S. 1301. Mr. Justice Rehnquist determined that the Court (and the Circuit Justices) have jurisdiction to vacate a stay "where it appears that the rights of the parties to a case pending in the court of appeals, which case could and very likely would be reviewed here upon final disposition in the court of appeals, may be seriously and irreparably injured by the stay, and the Circuit Justice is of the opinion that the court of appeals is demonstrably wrong in its application of accepted standards in deciding to issue the stay" (424 U.S. at 1303-1304). Mr. Justice Rehnquist concluded that the court of appeals failed properly to consider the applicant's probability of success on the merits and the irreparable injury that the stay would cause to the federal safety program (*id.* at 1306-1307).

ing-distance limitation, NHTSA made the following findings:[7]

> 1. Thousands of vehicles have been manufactured with antilock systems that have not reported any safety-related defects (40 Fed. Reg. 59223 (1975); 41 Fed. Reg. 8785-8786 (1976)).
>
> 2. Several large users and manufacturers of heavy vehicles had found that antilock-equipped vehicles can meet the standard's braking-distance requirements and provide good performance handling (40 Fed. Reg. 59223 (1975); 41 Fed. Reg. 8785-8786 (1976)).
>
> 3. Although some manufacturers complained of malfunctioning antilock equipment, these difficulties stemmed from the manufacturers' selection of devices that were not best suited for their vehicles (40 Fed. Reg. 59223 (1975); 41 Fed. Reg. 8785-8786 (1976)).
>
> 4. An extension of the braking-distance limitation from 277 feet to 293 feet (at 60 mph) would obviate the need for antilock devices on many of the vehicles subject to the standard (40 Fed. Reg. 59224 (1975)), and would prevent safety concerns claimed to result from overpowered front brakes on heavy vehicles (*ibid.*).

With these considerations in mind, the agency adopted the proposed extension of the braking-distance limitation in March 1976 (41 Fed. Reg. 8785-8789). The issues finally presented to the ocurt of appeals in July 1976, therefore, concerned both the agency's action in promulgating the standard in November 1974 and its review and disposition in March 1976 of claims of practical difficulties in implementing the standard.

[7] This review pertained to trucks and tractor-trailers. The application of the Standard to buses was postponed (40 Fed. Reg. 52856 (1975)), and the rules for buses were thus not at issue in the court of appeals.

4. The court of appeals held that the record demonstrates a "need" for the Standard under the Safety Act because the objectives of reducing stopping distances and improving handling during stops for heavy vehicles are substantially related to the goal of improving highway safety (App. A, *infra*, pp. 16a-18a). The court concluded, however, that the Standard's braking-distance limitation was "neither reasonable nor practicable at the time it was put into effect" (*id.* at 18a).

The court acknowledged that, before it promulgated the standard, NHTSA had confirmed the reliability of antilock devices on the basis of extensive proprietary data from antilock manufacturers (App. A, *infra*, p. 10a), that the devices had been used successfully on airplanes and cars, and that at least "some trucks" had been able to meet the braking-distance limitations of the standard (*id.* at 19a). The court stated, however, that "critical" (*ibid.*) and "unanticipated" (*id.* at 20a) problems developed with the mass production of vehicles designed to meet the standard by the use of antilock devices. Although the court acknowledged that "[t]he absolute number of

vehicles * * * [evidencing antilock problems] is quite small" (*id.* at 22a), it thought that there was a "strong probability" that antilock devices do not work well (App. A, *infra*, p. 26a).

Where such evidence of potential equipment failure develops, the court stated, "NHTSA has the responsibility to *assure* that the new systems it requires are reliable when placed in use" (App. A, *infra*, p. 23a; emphasis added). The court ruled that the agency could not satisfy this burden by relying on the absence of any reports of highway accidents related to the use of antilock equipment, or on evidence from manufacturers, or on tests conducted by NHTSA on three trucks in 1975, even though these indicia show that antilock devices are effective (*ibid.*). NHTSA must conduct "more intensive testing," the court concluded, to develop "probative and convincing data evidencing the reliability and safety of vehicles that are equipped with antilock [devices]" before the agency can adopt the braking-distance limitation in the standard (*id.* at 25a, 26a). In light of its conclusion about the antilock devices, the court held that the 293-foot braking-distance limitation in the Standard is not "practicable" (see 15 U.S.C. 1392(a)), and therefore concluded that the Standard is invalid.

The court also held that the Standard is neither "practicable" nor "objective" because it does not specify a procedure—other than road testing—that manufacturers may follow to fulfill their statutory duty to exercise "due care" in certifying vehicles to be in compliance with the Standard (App. A, *infra*,

p. 31a; see 15 U.S.C. 1397(a)(1)(C)).[8] The court stated that the road testing procedure in the Standard is not economically feasible for "intermediate and final stage manufacturers" (App. A, *infra*, pp. 30a-32a; see note 4, *supra*), and it held that the agency has a duty to "propose some alternative [compliance] method for those manufacturers * * *" (App. A, *infra*, p. 31a). The court declined to accept the agency's interpretation of the regulation as permitting manufacturers to comply with the statutory "due care" requirement "by any number of alternative methods, such as group testing [and] mathematical

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[8] The court also held that one of the Standard's specific testing requirements is invalid (App. A, *infra*, pp. 26a-32a). The Standard requires vehicles to meet stopping distance requirements on both dry and wet pavement surfaces. In order to permit uniform testing, NHTSA specified "skid numbers" for the dry and wet surfaces. The "skid numbers" are objective measures of the frictional resistance of pavement under specified conditions (App. A, *infra*, pp. 26a-27a). Although the court agreed that the testing requirements are "objective," it held that they are not "practicable," as required by the statute, 15 U.S.C. 1392(a). The court stated that, because the skid number of a given surface could fluctuate depending on weather conditions, manufacturers using a particular test track could not "assure that their vehicles will exactly meet the objective standard when tested by NHTSA" (App. A, *infra*, p. 28a). We disagree with this decision; indeed, the court's conclusion that the testing requirements are not practicable seems refuted by the court's finding that manufacturers *can* comply with the testing procedure by "overcompensat[ing]" (App. A, *infra*, p. 28a). The court of appeals did not dispute NHTSA's contention that precision is impossible and that the "overcompensation" required is not significant. Because NHTSA intends to issue new testing requirements, however, we do not present this issue to the Court.

calculations * * *" (App. A, *infra*, p. 31a). The court held that compliance alternatives under the Standard must be stated "without ambiguity" (*id.* at 32a).

REASONS FOR GRANTING THE PETITION

The court of appeals' decision in this case amounts to a substitution of judicial for administrative judgment in a manner repeatedly condemned by this Court and other courts of appeals. We ordinarily would not seek review of such a decision—wrong though it may be—because the governing principles are so well established, and a decision such as this turns more on the application of acknowledged principles to particular facts than on any dispute about the controlling legal rules. This case, however, is exceptional. The Standard at issue here is an especially important part of NHTSA's attempt to reduce highway fatalities, and its invalidation could lead to deaths and injuries that should be prevented. It is impossible to predict the number of additional accidents that will be caused by the invalidation of the Standard, but the court of appeals' own conclusion on the need for the Standard (App. A, *infra*, pp. 16a-18a) suggests that there will be some. Moreover, the testing and research requirements established by the court of appeals are a formula for administrative paralysis, and they threaten to hinder the repromulgation of the Standard and the consideration of other safety-related rules.

1. The role of a court reviewing an administrative decision "is a limited one." *Vermont Yankee Nuclear*

Power Corp. v. *Natural Resources Defense Council, Inc.*, No. 76-419, decided April 3, 1978, slip op. 33. A safety standard promulgated by NHTSA under the Safety Act is informal rulemaking, and therefore it should be upheld unless it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law." 5 U.S.C. 706(2)(A). See *B.F. Goodrich Co.* v. *United States Department of Transportation*, 541 F.2d 1178, 1181-1182 (C.A. 6), certiorari denied, 430 U.S. 930; cf. *United States* v. *Allegheny-Ludlum Steel Corp.*, 406 U.S. 742, 757. A court's "paramount objective" in reviewing regulations under the Safety Act "is to see whether the agency, given an essentially legislative task to perform, has carried it out in a manner calculated to negate the dangers of arbitrariness and irrationality * * *." *Automotive Parts & Accessories Association* v. *Boyd*, 407 F.2d 330, 338 (C.A.D.C.). Review under this standard is narrow, and the reviewing "court is not empowered to substitute its judgment for that of the agency." *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402, 416. A court should uphold a reasoned agency decision, even though the propriety of the decision cannot be established by convincing proof. *Federal Communications Commission* v. *National Citizens Committee for Broadcasting*, No. 76-1471, decided June 12, 1978, slip op. 19-20, 25-32, 36. The court of appeals disregarded these principles in this case.

The court of appeals held that, because problems had arisen in antilock devices made by certain firms,

it was arbitrary and capricious for NHTSA to conclude that the braking-distance limitation in the Standard is "practicable," as the Act requires, 15 U.S.C. 1392(a) (App. A, *infra*, p. 18a). The fact that manufacturers may encounter difficulties in complying with a safety standard, however, does not necessarily indicate that the standard is not "practicable." [9] A safety requirement that calls for difficult or expensive measures may nonetheless be "practicable" if it is technologically capable of being accomplished. See H.R. Rep. No. 1776, 89th Cong., 2d Sess. 16 (1966). Indeed, in adopting safety standards, the agency may "require improvements in existing technology or * * * the development of new technology * * * in accord with the Congressional mandate that 'safety shall be the overriding consideration in the issuance of standards.'" *Chrysler Corp.* v. *Department of Transportation*, 472 F.2d 659, 673 (C.A. 6). The requirement of practicability means simply that the safety standard may not call for more than can feasibly be accomplished within the time provided.[10]

[9] The fact that some manufacturers claim to have experienced difficulties with antilock equipment cannot by itself mean that the standard is impractical. If it did, then a manufacturer could defeat implementation of a safety standard merely by employing improper technology (see 41 Fed. Reg. 8786 (1976)). The agency was justifiably concerned that its standard not reflect only the lowest common denominator in manufacturing competence.

[10] Cf. *Frey* v. *Security Insurance Co.*, 331 F. Supp. 140, 143 (W.D. Pa.) ("'Practicable' means feasible in the circumstances").

NHTSA gave repeated, substantial consideration to the practicability of its brake-distance limitation (see, *e.g.*, 41 Fed. Reg. 8786 (1976); 40 Fed. Reg. 59223 (1975); 39 Fed. Reg. 39,880 (1974)). The agency found that several manufacturers have successfully developed and installed antilock devices in heavy truck assemblies (see page 10, *infra*). Major users have reported successful compliance by "judicious selection of antilock componentry * * *" (40 Fed. Reg. 59223 (1975)). Moreover, representatives of the heavy vehicle manufacturing industry repeatedly have told the agency that the industry is technologically able to comply with the Standard (see 41 Fed. Reg. 8785-8786 (1976).[11] Tests performed by NHTSA in 1975 on three antilock-equipped trucks also revealed that the heavy-truck industry possesses the necessary technology to meet the standard (see App. A, *infra*, p. 25a). The agency reasonably concluded from this evidence that the braking-distance limitation in the standard may be met by use of available technology. Under the Safety Act, this is sufficient to

[11] As of the date this case was submitted to the court of appeals, three manufacturers of antilock equipment had not reported a single safety-related defect in the performance of the equipment. This establishes that antilock devices can be made by those who strive to meet the Standard's requirement (41 Fed. Reg. 8786 (1976)). Moreover, the fact that respondents Paccar and TEBDA certify daily that their antilock-equipped vehicles comply with all the requirements of the Standard at least places in question their allegation that antilock devices do not work. NHTSA advises us that, to date, approximately 1 million vehicles have been certified by their manufacturers as complying with the Standard.

establish that the Standard is "practicable." The court of appeals' conclusion, in the face of this evidence, that the agency's judgment was arbitrary or capricious "deprive[s] those words of any meaning." *Vermont Yankee Nuclear Power Corp.* v. *Natural Resources Defense Council, Inc., supra,* slip op. 32.

The court's further determination that the Standard is not "practicable" because it does not specify compliance procedures for intermediate and final stage manufacturers is also erroneous. The court did not find that it is not "practicable" for these manufacturers to employ "due care" in certifying their vehicles to be in compliance with the Standard. Instead, the court stated that an unelaborated "due care" requirement is improper because it is too ambiguous (App. A, *infra,* p. 32a). But the requirement that manufacturers exercise "due care" in certifying that vehicles meet the Standard is established by the statute, 15 U.S.C. 1397(a)(1)(C), and not by the regulation.[12] There is nothing in the language or history of the statutory requirement to suggest that Congress intended that "due care" be defined in general regulations rather than on a case-by-case basis. In particular, there is no support for the court's conclu-

[12] The regulation does not, on its face, establish compliance procedures for manufacturers. The road testing provisions of the Standard merely constitute part of the objective specification of the braking-distance limitation. While compliance with the road testing procedures during certification may constitute due care as required by the statute, the agency has never taken the position that road testing is required to establish due care. See App. A, *infra,* p. 31a.

sion that the inherently flexible "due care" requirement of the statute must be implemented by the agency in language "drafted without ambiguity" (App. A, *infra,* p. 32a). The court's decision has thus usurped the agency's discretion to determine whether to proceed by regulation or on a case-by-case basis to implement the statutory due care requirement.[13] See *Securities & Exchange Commission* v. *Chenery Corp.,* 332 U.S. 194, 202-203.

2. The court of appeals sought to justify its conclusion that the agency has acted arbitrarily and capriciously in adopting the braking-distance limitation in the Standard by stating that "NHTSA has the responsibility to assure that the new systems it requires are reliable when placed in use" (App. A, *infra,* p. 23a).[14] Although the court acknowledged that NHTSA had made a determination of reliability on the basis of (1) extensive proprietary data from antilock manufacturers showing millions of axle miles

[13] Where the Secretary suspects that a manufacturer is in violation of any requirement of the Standard, the Secretary may give notice to the suspected violator and afford him an opportunity to demonstrate his compliance. 15 U.S.C. 1399(a).

[14] The court of appeals stated that the Sixth Circuit had applied such a requirement in *Chrysler Corp.* v. *Department of Transportation,* 472 F.2d 659, 673. That case, however, held only that complaints of equipment malfunction should be reviewed by NHTSA to determine whether a safety standard should be deferred, modified or abandoned. The court did not state, or even suggest, that NHTSA has a duty to "assure" equipment reliability by "intensive testing," as the court of appeals has held in this case (see App. A, *infra,* pp. 23a, 25a).

of reliable performance; (2) the absence of significant reports of safety-related defects in the devices, which were in use on some passenger cars and aircraft; and (3) its own sample testing of complying vehicles (*id.* at 10a, 24a-25a), the court found these evidence-gathering techniques to be "inadequate" (*id.* at 25a). Because of a "quite small" number of reported antilock equipment malfunctions (*id.* at 22a), the court held, NHTSA must conduct "intensive testing" to develop "convincing data" establishing the reliability of antilock equipment.[15]

The court of appeals erred both in its statement that NHTSA must "assure" the reliability of manufacturer's equipment and in its holding that only intensive scientific testing, rather than substantial industry experience, may be relied on by NHTSA in determining that the safety standard is practicable.

a. We argued above that the agency may require manufacturers to develop and implement safety de-

[15] The agency reviewed the claims of equipment malfunction in March 1976. NHTSA found that the claimed malfunctions present only "an extremely small chance" that an actual safety hazard would result, because a malfunctioning antilock system disables itself and "return[s] braking to normal" (41 Fed. Reg. 8786). The agency concluded that "the risk of malfunction [is] small and out-weighed by the benefits" of implementing the technology (*ibid.*). This evaluation of competing considerations is well within the discretion properly conferred on the agency. See *Automotive Parts & Accessories Association* v. *Boyd*, 407 F.2d 330, 342 (C.A.D.C.). The court of appeals did not indicate, or even discuss, whether the agency's judgment in this regard was "clear error." See *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, *supra*, 401 U.S. at 416.

vices that are technologically feasible, even if expensive or complex (see page 16, *supra*). Once the technological competence exists to implement a practicable standard, it is the duty of the manufacturers, not of the agency, to select and install reliable equipment to achieve the safety performance standard. 15 U.S.C. 1397.[16] The court of appeals' misallocation of these duties under the Safety Act produces the unfortunate result that an intransigent industry—or even a handful of intransigent or incompetent members of an industry—may impede implementation of a technologically and economically practicable safety standard merely by ineptly employing available technology. It was error for the court to hold that, because some noncomplying vehicles have been made, the agency may not enforce the Standard that was designed to bring about compliance.

b. In determining whether a proposed safety standard is practicable, NHTSA must consider "relevant available motor vehicle safety data, including the results of research, development, testing and evaluation activities conducted pursuant [to the Act]." 15 U.S.C. 1392(f)(1). This provision does not require the agency to use any particular type of evidence in the rule-making procedure. Although Congress authorized the agency to "conduct research, testing, development, and training necessary to carry out the

[16] Indeed, Congress intended that the agency issue performance standards only and allow industry to select and implement the necessary equipment. See page 5, *supra*.

purposes of [the Act,]" 15 U.S.C. 1395(a), it did not circumscribe the agency's discretion to decide what kinds of evidence and which evidence-gathering techniques are best suited for particular aspects of its decisional process. The court of appeals' holding that the Safety Act "commanded" NHTSA to conduct research about the reliability of equipment developed by manufacturers to comply with safety standards is therefore unsupported.[17] Neither "convincing data" nor affirmative "proof" based on research and testing is required.[18]

In the first place, the court of appeals' analysis misplaces the burden of proof. When a legislative rule such as is involved here is challenged,[19] the opponent of

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[17] The court of appeals relied in part on 15 U.S.C. 1401(a)(1), for its conclusion that NHTSA has an affirmative duty to conduct reliability tests on manufacturers' equipment (App. A, *infra*, p. 24a). This provision authorizes the Secretary to "conduct any inspection or investigation * * * which may be necessary to enforce" motor vehicle safety standards. Nothing in the language or history of this provision suggests that by "authorizing" the Secretary to conduct such investigations Congress meant to "require" the Secretary to conduct investigations as a condition precedent to the enforcement of a federal safety standard. See H.R. Conf. Rep. No. 1919, 89th Cong., 2d Sess. 20 (1966).

[18] Even if "testing" is the only permissible evidentiary procedure, NHTSA relied in part on the successful results of tests conducted in 1975 on antilock-equipped trucks (see App. A, *infra*, pp. 24a-25a), and it received from manufacturers reports that also apparently rested on tests and experience (*id.* at 10a).

[19] See *Automotive Parts & Accessories Association* v. *Boyd*, *supra*, 407 F.2d at 338.

the rule, and not the agency, bears the "heavy burden" of showing that the agency's determination was outside the bounds of its discretion. See *Mobil Oil Corp.* v. *Federal Power Commission*, 417 U.S. 283, 316. Moreover, "[a]t least in the absence of substantial justification for doing otherwise," a reviewing court is not to "dictat[e] to the agency the methods, procedures, and time dimension of the needed inquiry * * *." *Federal Power Commission* v. *Transcontinental Gas Pipe Line Corp.*, 423 U.S. 326, 333. The court of appeals did not identify a "substantial justification" for its "research" requirement here; the statute simply calls for the agency to exercise its informed judgment in light of "relevant available motor vehicle safety data." 15 U.S.C. 1392(f)(1). By dictating the agency the forms of technical evidence that may be considered in the rulemaking proceeding, the court of appeals improperly entered "the domain which Congress has set aside exclusively for the administrative agency." *Federal Power Commission* v. *Transcontinental Gas Pipe Line Corp.*, *supra*, 423 U.S. at 333, quoting *Securities & Exchange Commission* v. *Chenery Corp.*, 332 U.S. 194, 196. Where, as in this case, the agency relied on available evidence to reach a reasoned decision, the court has no authority to impose an additional requirement that the evidence be "convincing" or be based on "intensive testing."

CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted.

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JULY 1978.

APPENDIX A

UNITED STATES COURT OF APPEALS
NINTH CIRCUIT

Nos. 75-1017, 75-2831 and 75-3182

PACCAR, INC., PETITIONER

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION and DEPARTMENT OF TRANSPORTATION, RESPONDENTS

TRUCK EQUIPMENT & BODY DISTRIBUTORS ASSOCIATION, PETITIONER

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION and DEPARTMENT OF TRANSPORTATION, RESPONDENTS

AMERICAN TRUCKING ASSOCIATION, PETITIONER

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION and DEPARTMENT OF TRANSPORTATION, RESPONDENTS

April 17, 1978

Before BROWNING, ELY and TRASK,
Circuit Judges

ELY, Circuit Judge:

Paccar, Inc., the builder of Kenworth and Peterbilt trucks, the American Trucking Associations, Inc. (ATA) and the Truck Equipment and Body Distributors Association (TEBDA) challenge Motor Vehicle Safety Standard No. 121 (the Standard) regulating air-braked trucks and tractor-trailers.[1] The Standard was issued by the National Highway Traffic Safety Administration (NHTSA) pursuant to the National Traffic and Motor Vehicle Safety Act of 1966 (the Act),[2] and is challenged here for the first time.

Congressional concern over the rising highway accident rate, the loss of lives and property incidental thereto, and the tendency of automobile manufacturers to concentrate on cosmetic design to the detriment of safety design, prompted passage of the Act. Congress voiced its belief that "the restrained and responsible exercise of Federal authority can channel the creative energies and vast technology of the automobile industry into a vigorous and competitive effort to improve the safety of vehicles." S. Rep. No. 1301, 89th Cong., 2d Sess. 1, *reprinted in* [1966] U.S. Code Cong. & Admin. News pp. 2709, 2709 [*sic*].

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[1] 49 C.F.R. § 571.121. The part of the Standard that regulates air-braked buses is not an issue here.

[2] 15 U.S.C. § 1381-1431.

To this end the Secretary of the Department of Transportation (Secretary) was given authority to regulate motor vehicle safety by the promulgation of appropriate minimum performance standards. 15 U.S.C. § 1392. The purpose of the Act is to "reduce traffic accidents and deaths and injuries to persons resulting from traffic accidents." 15 U.S.C. § 1381. "[S]afety shall be the overriding consideration in the issuance of standards . . . ."[3] Each standard must meet the need for motor vehicle safety[4] and must be stated in objective terms. 15 U.S.C. § 1392(a). The Secretary is instructed to consider "available motor vehicle safety data, including the results of research, development, testing and evaluation activities conducted pursuant to this chapter." 15 U.S.C. § 1392 (f)(1). A separate section requires the Secretary to carry out research and development, which can be done by grants to "States, interstate agencies, and nonprofit institutions." 15 U.S.C. § 1395(a), (b). The Secretary is required to consider whether a

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[3] S.Rep. No. 1301, 89th Cong., 2d Sess. 6, *reprinted in* [1966] U.S. Code Cong. & Admin. News pp. 2709, 2714.

[4] "Motor vehicle safety" is defined in the Act as:

> the performance of motor vehicles or motor vehicle equipment in such a manner that the public is protected against unreasonable risk of accidents occurring as a result of the design, construction or performance of motor vehicles and is also protected against unreasonable risk of death or injury to persons in the event accidents do occur . . . .

15 U.S.C. § 1391(1).

standard is "reasonable, practicable [5] and appropriate for the particular type of motor vehicle" and "will contribute to carrying out the purposes of this chapter." 15 U.S.C. § 1392(f). He has authority to amend standards and to delay their effective date when the need arises.[6] The rulemaking power of the Secretary may be delegated to NHTSA. 49 C.F.R. § 501.2.

Each manufacturer [7] of affected vehicles must certify that vehicles produced after the effective date of a standard conform to that standard. An exception is made for "incomplete vehicle manufacturers," who may refuse to certify or provide a qualified certification.[8] With that qualification, failure to certify, or

[5] "Practicable" is defined to "require consideration of all relevant factors, including technological ability to achieve the goal of a particular standard as well as consideration of economic factors." H.R. Rep. No. 1776, 89th Cong., 2d Sess. 16 (1966).

[6] Congress foresaw that such postponements might be necessary "because it may be a practical economic and engineering impossibility, as well as a source of great hardship and unnecessary additional cost, to require that all vehicle changes required by any new safety standard . . . be accomplished . . . within 1 year." S. Rep. No. 1301, *supra* note 3, at 7, *reprinted in* [1966] U.S. Code Cong. & Admin. News pp. 2709, 2714.

[7] " 'Manufacturer' means any person engaged in the manufacturing or assembling of motor vehicles or motor vehicle equipment, including any person importing motor vehicles or motor vehicle equipment for resale." 15 U.S.C. § 1391(5).

[8] 49 C.F.R. § 568.4(a)(7)(iii). An incomplete manufacturer that builds a chassis-cab, which is thereafter turned into a specialized truck by a "final stage manufacturer," must certify that the completed vehicle will conform to the standard if specified instructions are followed. *See* text accompanying note 58 *infra*.

false certification, is punishable by civil fines in amounts up to $800,000.[9] Moreover, any vehicle which is sold to a distributor or dealer, and thereafter found to be nonconforming, must be recalled by the manufacturer, at his expense, or brought into conformity where located. The manufacturer must pay the distributor or dealer "a reasonable reimbursement" at a rate that is fixed by the statute. 15 U.S.C. § 1400(a).

Once NHTSA has indicated that a standard is final, any person "adversely affected" may petition the United States Court of Appeals for review. 15 U.S.C. § 1394. The House Report [10] states that judicial review under the Act is based on the compliance provisions of the Food and Drug Act, 21 U.S.C. § 371(f)(3), which contains a substantial evidence requirement.[11] The Act itself provides that the Administrative Procedure Act "shall apply to all orders establishing . . . a Federal motor vehicle safety standard," 15 U.S.C. § 1392(b), and the Administrative Procedure Act allows agency action to be held unlawful if "arbitrary, capricious, an abuse of discre-

[9] 15 U.S.C. §§ 1397(a)(1)(C), 1398. When a vehicle is certified falsely, the provisions of these sections apply only if the person certifying "in the exercise of due care has reason to know that such certificate is false or misleading in a material respect." 15 U.S.C. § 1397(a)(i)(C).

[10] H.R. Rep. No. 1776, *supra* note 5, at 16.

[11] *See also* S. Rep. No. 1301, *supra* note 3, at 8, *reprinted in* [1966] U.S. Code Cong. & Admin. News pp. 2709, 2715-16.

tion, or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A).

Whether there is a distinction between the tests of "substantial evidence" and "arbitrary and capricious" is the subject of vigorous debate,[12] but we see no pressing need to resolve that question here. The Secretary is required to file with the Court the evidence on which the standard was based. 15 U.S.C. § 1394 (a)(1). The factual basis of the Standard is subject to a "thorough, probing, in-depth review" and we are "required to decide whether the Secretary acted within the scope of his authority." *Citizens to Preserve Overton Park, Inc.* v. *Volpe*, 401 U.S. 402, 415, 91 S.Ct. 814, 823, 28 L.Ed.2d 136 (1971). "Although this inquiry into the facts is to be searching and careful, the ultimate standard of review is a narrow one. The court is not empowered to substitute its judgment for that of the agency." *Id.* at 416, 91 S.Ct. at 824.

HISTORY OF THE STANDARD

In October, 1967, the predecessor of NHTSA announced its intention to promulgate a standard for air-braked trucks, tractor-trailers, and buses. 32 Fed. Reg. 14,278 (1967). A notice of proposed rulemaking was published in January, 1969, 34 Fed. Reg. 1055 (1969), and the proposed standard for trucks and buses was released on June 25, 1970, with a proposed effective date of January 1, 1972, 35 Fed.

[12] *See* K. Davis, Administrative Law of the Seventies §§ 29.00 to .01-5 (1976).

Reg. 10,368 (1970).[13] The proposed standard required vehicles to stop within certain distances, from certain speeds, without leaving a 12-foot wide lane, and without lockup of any wheel "more than momentarily." It set forth brake actuation and release times, specified a relationship between brake chamber air pressure and brake retardation force (to be determined by placing each brake on an inertia dynamometer), provided for repetitious testing to assure brake recovery, and required a number of back-up systems for both system brakes and parking brakes. The initial stopping distance requirement from 60 mph was 217 feet on a dry (skid number 75)[14] surface.

The Standard was amended on numerous occasions, first, by increasing from 217 feet to 245 feet the distance in which a vehicle travelling at 60 mph was required to stop. This first increase was allowed "to more accurately reflect the friction characteristics of a surface with a skid number of 75 . . . ." [15] The effective date of the Standard was extended until January 1, 1973.

[13] The first proposal regulating air brakes on trailers was published at 35 Fed. Reg. 10,456 (1970) with the same proposed effective date of January 1, 1972.

[14] The "skid number" roughly measures the friction between the tire and the pavement: the "stickier" the pavement the higher the skid number.

[15] 36 Fed. Reg. 3817 (1971). *See also* 37 Fed. Reg. 12,496 (1972).

In February, 1972, in response to petitions from manufacturers requesting reconsideration, the effective date was advanced to September 1, 1974, to "permit a longer period of fleet testing to evaluate the durability of the new systems . . ." 37 Fed. Reg. 3907 (1972). NHTSA noted that "a number of petitions requested increases in the stopping distance required by S5.3.1. The distances specified are considered reasonable and well within the state of the art. Greater distances would increase the disparity between trucks and cars and be contrary to the interests of safety." *Id.* These petitions were denied, without recitation as to the process by which the agency reached its determination.

The stopping distances prescribed by NHTSA were far shorter than the former stopping distances achieved by large trucks. Therefore, a completely new braking system was necessary[16] and, since the Standard also demanded that stops be made without lock-up of wheels (more than "momentarily"), most manufacturers notified NHTSA that an "antilock"

[16] As described by Rockwell: "Front axles require redesign to carry the added combined load. The lower rated axles require redesign in all components, the higher rated ones require minimum redesign. All of the mountings for the brakes must be strengthened." Letter from Rockwell to NHTSA (Oct. 12, 1971) (Doc. No. 70-16-PRC-036). *See also* Letter from Ford Motor Co. to NHTSA (Jan. 14, 1974) (Doc. No. 121-PRM-000031); Letter from General Motors Corp. to NHTSA (Nov. 28, 1973) (Doc. No. 70-17-No4-001).

device was required.[17] This device consists of a minicomputer attached to each axle of the truck or tractor-trailer which "senses" when a wheel begins to lock and momentarily releases the brake to regain traction. The agency indicated that the Standard did not "require" such a device but set forth criteria for it if used, 36 Fed. Reg. 3817 (1971), and noted its faith in the device's reliability.[18]

In May, 1974, NHTSA again extended the stopping distance, this time allowing 258 feet for a stop from 60 mph. The reason given was the necessity to account for "production variations." [19] In addition,

[17] Manufacturers have indicated that, to meet this requirement, they will supply substantial braking torque on front axles and will prevent uncontrolled wheel lock-up in most cases by use of newly-developed antilock control systems. Most requests to modify the standard are prompted by uncertainty as to the availability and reliability of the necessary components involved in these changes.

39 Fed. Reg. 7966 (1974).

[18] The NHTSA has found that antilock systems are reliable and offer significant improvement in vehicle braking characteristics.

. . .

The systems permit fast, stable deceleration in emergency situations. A driver will not rely on this type of deceleration for routine maneuvers because of the discomfort to him and danger of load shifts associated with panic stops.

39 Fed. Reg. 7967 (1974).

[19] Most manufacturers argued that the 5 percent longer distances would be required for the indefinite future, because production variations would continue to affect performance significantly. The NHTSA established the

the effective date of the Standard was delayed until March 1, 1975, for trucks and buses, and until September, 1975, for trailers. 39 Fed. Reg. 20,350 (1974).

In early 1974, the agency began to receive continual complaints to the effect that antilock devices were unreliable, and rendered vehicles dangerously unsafe when combined with new, more effective brakes.[20] In 1974, NHTSA replied that the Standard was practicable as written, since its own investigation of the major antilock manufacturers indicated "millions of axle miles of antilock operation with a malfunction rate comparable to other equipment presently in highway service, and no highway accidents attributable to the device." The agency announced that the Standard was "final" for purposes of review. 39 Fed. Reg. 39,881 (1974).

> stopping distances on the basis of the ability of available equipment, and expects that experience in the production of these components will lead to predictable quality and the assurance that a vehicle, will in fact perform as well as it is designed to.

39 Fed. Reg. 17,553 (1974).

[20] "[W]e believe that a most serious safety problem may be created by present state-of-the-art brake systems designed to meet MVSS-121. This is due to the possibility of complete loss of vehicle control resulting from a failure of the wheel lock control system." Letter from General Motors Corp., *supra* note 16; *see* 39 Fed. Reg. 17,550 (1974); Letter from Ford Motor Co. to NHTSA (Apr. 1, 1974) (Doc. No. 74-10-No1-023).

But "finality" did not mean an end to amendments, nor to industry protestations.[21] NHTSA acknowledged that production variables were affecting performance,[22] and moved to amend the Standard to increase

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[21] *See* 41 Fed. Reg. 8783 (1976); 41 Fed. Reg. 198 (1976); 40 Fed. Reg. 38,160 (1975); 40 Fed. Reg. 21,031 (1975); 40 Fed. Reg. 12,797 (1975); 40 Fed. Reg. 8953 (1975). ATA wrote the agency:

> Our fears arise from ample evidence (1) that the new vehicles built in accord with the Standard will be difficult to maintain, (2) that they will be uncontrollable where the antilock features of the front axle do not function as they are supposed to, and (3) that it is now shown that the unproved devices mandated by the rule are failing . . . .

Letter from ATA to NHTSA (Mar. 25, 1975) (Doc. No. 74-10-No15-004).

[22] General Motors . . . indicated that similar 121 vehicles can register as much as a 20-percent difference in stopping distances as a result of uncontrolled variability in brake component performance. International Harvester, which until recently had supported 5-percent longer stopping distances on an interim basis, now points to certain variables, including brake linings, in requesting long distances on a permanent basis. Diamond Reo reported the same experience . . . .

40 Fed Reg. 12,797 (1975).

> Petitions to reduce Standard No. 121's stopping distance requirements were received from six manufacturers and users of air-braked trucks and from Wagner Electric Corporation . . . . The manufacturers of components and vehicles argue essentially that production and test procedure factors introduce sufficient variability into the performance of their products that large "compliance margins" of overdesign must be built into each unit to assure 100 percent compliance with the standard's requirements. These petitions assert that, as a result, ve-

the stopping distance to 277 feet at 60 mph. 40 Fed. Reg. 38,160 (1975). This amendment was calculated to allow manufacturers to "depower" the front axles, relieving the danger of lockup in the event of antilock failure. The agency conceded that the requirements of the original Standard were difficult to achieve in a mass production situation.[23] In a con-

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hicle designs have reached the maximum limits of brake technology and the brake systems can produce significant lateral instability and related poor handling characteristics. The petitions of users . . . argue that antilock systems, used by most manufacturers to meet the standard, are unreliable and constitute a safety hazard on the steering axle in combination with strong front wheel brakes.

40 Fed. Reg. 24,915 (1975).

[23] [T]his agency has evaluated the submitted data which show variability of various components and concludes that the degree of variability can necessitate more aggressive brake packages than are desirable to achieve the stopping distances contemplated in development of the standard. One undesirable characteristic cited by PACCAR is the side-to-side handling problems which can arise during severe braking associated with any imbalance of the brakes. Ford data demonstrate the point at which tire aligning torque becomes negative and contributes to steering instability under severe braking. Other manufacturers conclude that the variability in brake assembly and other areas forces use of brake packages which approach the maximum in technological feasibility and leaves no room for a "compliance margin." In agreement that these problems can arise in some cases, NHTSA proposes an increase in the stopping distance permissible in a stop from 60 mph in the loaded condition on a test surface with a skid number of 75 (with corresponding changes at lower speeds).

40 Fed. Reg. 24,916 (1975).

tinuing attempt to find a reasonable stopping distance within the technological reach of a mass production industry, the agency announced that a public meeting was necessary to explore the complaints about the safety of the antilock systems, and to "fully consolidate and evaluate such data." [24] This was not the first public meeting called by NHTSA, but it was the first to concentrate on the antilock system, the stopping distance requirements, and the dangers. In October, 1975, nine months after the Standard went into effect for trucks and buses, a public hearing was held in Washington, D. C., with members of the industry and public invited to attend to comment "on the record." [25] As a result, NHTSA proposed and effected a one-year suspension of the Standard for buses, be-

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[24] The NHTSA has received reports that the new-introduced (*sic*) braking systems and antilock systems of some manufacturers, have not been operating properly, causing increased maintenance and the possibility of unsafe vehicle braking performance. Eight safety-related defects in the production systems have been reported to the NHTSA, and recall campaigns are underway at this time.

* * * *

To ensure that the data upon which the NHTSA relies are complete, the agency considers it imperative to collect all existing information on the operation of the new systems as soon as possible. For these reasons the NHTSA has determined that . . . a public meeting is desirable to discuss the field experience accumulated with the new vehicles.

40 Fed. Reg. 43,050 (1975).

[25] Unlike most prior public meetings, the October meeting was recorded and transcribed.

cause of "a pattern of erratic behavior of bus antilock equipment." 40 Fed. Reg. 52,856 (1975).

The agency also found that "some vehicles produced to comply with the standard demonstrate unsatisfactory handling characteristics. The source of the problem is not technological unfeasibility of producing vehicles with desirable handling characteristics, as demonstrated by many of the 121-equipped vehicles produced since March 1, 1975." 41 Fed. Reg. 8786 (1976). NHTSA found that large compliance margins and component variability were the cause of the manifest problems. While indicating that it could require redesign to solve these problems, NHTSA chose instead to extend the stopping distances once more, allowing a vehicle travelling 60 mph to stop within 293 feet. *Id.* Additional extensive changes of the Standard as it affects trucks and tractor-trailers, 40 Fed. Reg. 56,920 (1975), were proposed. At the time of oral argument in our court, three amendments were still pending. 41 Fed. Reg. 29,696 (1976). The effective date of the Standard as it applies to buses was postponed until January, 1977, because of severe antilock problems. 40 Fed. Reg. 52,856 (1975).

THE MERITS

Paccar and ATA have concentrated their attack on the Standard's stopping distance criteria, *i.e.*, the antilock requirement.[26] All petitioners argue that the

[26] Although NHTSA denies that antilock is required by the Standard, extensive testimony and evidence from the industry,

testing procedures promulgated by NHTSA are "non-objective" and TEBDA individually objects to the certification requirements of the Standard.

Paccar and ATA vigorously assert that the Standard does not meet the statutory requirement of "practicability" because no need has been demonstrated for this air brake system, the cost of the system is high,[27] and its requirements are beyond the reach of current technology. They argue that it is not a "reasonable" standard, since the failure of what they consider an unreliable device, the antilock, in a panic braking situation creates a potentially more danger-

unrebutted agency evidence, convinces us, as a practical matter and beyond doubt, that antilock was necessary to meet the Standard. *See, e.g.*, 39 Fed. Reg. 7966 (1974); Letter from Ford Motor Co., *supra* note 16; Letter from General Motors Corp., *supra* note 16; Letter from International Harvester Co. to NHTSA (Mar. 26, 1971) (Doc. No. 70-16-PRC-001); Letter from Wagner Electric Corp. to NHTSA (Apr. 10, 1975) (Doc. No. 74-10-No15-010); Testimony of Consolidated Freightways, Inc. at TR-15 (Oct. 1975) (Doc. No. 75-16-No2-042).

[27] At the public hearings truck manufacturers testified that the following costs are attributable to the Standard: Ford Motor Co., $23 million, Testimony at TR-351 (Oct. 1975) (Doc. No. 75-16-No2-042); General Motors Corp., $15 million, Testimony at TR-360; Kelsey-Hayes, $25 million, Testimony at TR-388. The antilock system adds $1200 to $1500 to the cost of each truck. Testimony of National Ass'n of Motor Bus Owners at TR-63; Testimony of Greyhound Lines, Inc. at TR-70, 88; Testimony of Transport of New Jersey at TR-128; Testimony of Leaseway Transp. Corp. at TR-228. The President's Council on Wage and Price Stability estimated that the Standard would cost as much as $400 million per year in capital costs alone. Testimony at TR-306-07.

ous situation than a "prestandard" vehicle because of the new, stronger braking system.

In charging that no "need" has been demonstrated for this Standard, Paccar and ATA ignore the extensive record compiled by the agency. Congress was aware that "it is virtually impossible to obtain specific information and data concerning the causes of traffic accidents . . . ." H.R. Rep. No. 1776, *supra* note 5, at 11. To combat this uncertainty, the Secretary was empowered to implement standards and conduct research. Two studies commissioned by NHTSA found that improving truck and tractor-trailer stability, by preventing jackknifing and wheel lockup, would substantially increase the safety of these massive vehicles on the highway.[28] Several studies cited in the administrative record indicate that greater braking capability would improve highway safety.[29] In addition, the evidence produced by NHTSA supports the proposition that in down-hill accidents, trucks (undifferentiated from tractor-trailers) are the striking vehicle far more frequently than their numbers on

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[28] R. Murphy, R. Limpert & L. Segal, Highway Safety Research Institute of the University of Michigan, Bus, Truck, Tractor-Trailer Braking System Performance (Mar. 1971) [hereinafter cited as Murphy Report]; National Transportation Safety Board, Special Study—Commercial Vehicle Braking (Nov. 1972).

[29] Federal Highway Administration, U.S. Dep't of Transportation, Emergency Application Systems for Power Brake Mechanisms on Highway Trailer Combinations (Aug. 1970); Murphy Report, *supra* note 28.

the road would dictate.[30] There is evidence that the size and weight of these vehicles can produce disastrous results to occupants of automobiles when an accident occurs [31] and that the jackknifing of tractor-trailers can produce "chain-reaction" accidents.[32] While there is no direct evidence that shorter braking distances would prevent a particular number of accidents, the conclusion from one study was that trucks travelling at an "unreasonable speed for conditions, not necessarily above the posted speed limit" were involved in nearly 43% of the accidents investigated.[33] Common sense would seem to indicate that when two types of vehicles of widely divergent size share the same roadway, and the larger, heavier vehicle has a much longer stopping distance, any situation which requires emergency braking is potentially disastrous to the smaller automobile and its passengers.

It has been asserted that improved brake maintenance would eliminate accidents attributable to brak-

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[30] Scott & O'Day, Statistical Analysis of Truck Accident involvements (1971) (Contract HS-800-627); Baker, Wong & Masemore, Fatal Tractor-Trailer Crashes: Considerations in Setting Relevant Standards (July 14, 1975) (Doc. No. 75-16-No1-067).

[31] NHTSA, Update of Information on Heavy Truck Accidents (Dec. 8, 1975) (Doc. No. 75-16-No5-056); Scott & O'Day, *supra* note 30; R. Wolf, Cornell Aeronautical Laboratory, Truck Accidents and Traffic Safety—An Overview (1968).

[32] Baker, Wong & Masemore, *supra* note 30.

[33] Bureau of Motor Carrier Safety, U.S. Dep't of Transportation, Summary of Accident Investigations (1969). *See also* Baker, Wong & Masemore, *supra* note 30.

ing systems without the need to install new brake mechanisms. While there is some evidence that better brake maintenance would solve a number of problems,[34] we are satisfied, from our review of the data, that NHTSA was justified in promulgating a Standard requiring improved air brake systems and stability mechanisms for the industry.

The goals of the Standard, decreasing the disparity of stopping distances between ordinary automobiles and heavier vehicles, 37 Fed. Reg. 3905 (1972), and maintaining vehicle stability and directional control, 41 Fed. Reg. 8784 (1976), are both reasonable and practicable. However, after a careful review of the extensive record in this case, we have come to the conclusion that because of unforeseen problems in the development of the new braking systems, the Standard was neither reasonable nor practicable at the time it was put into effect.

The House Report stated: "Standards, of course, cannot be set in a vacuum. They must be based on reliable information and research." H.R. Rep. No. 1776, *supra* note 5, at 11. To this end, the agency was commanded to conduct such research itself, or to secure the results of research by contracts with "States, interstate agencies, and nonprofit institutions." 15 U.S.C. § 1395(a), (b). We are not persuaded that the Standard, *as finally issued*, was based

[34] *Brakes, Fleet Owner*, Feb. 1963, at title page; R. Wolf, *supra* note 31; Testimony of Captain E. Kynaston, California Highway Patrol, at TR-485 (Oct. 1975) (Doc. No. 75-16-No2-042).

on the quality of "reliable information and research" that the Act required as a prerequisite.

NHTSA originally proposed a standard that it considered well within the "state of the art." Antilock devices had been used on some cars and aircraft.[35] Some trucks were easily able to meet the stopping requirements of the Standard. 41 Fed. Reg. 8785 (1976). But the critical problems began with mass production of vehicles designed to meet the Standard.

The Standard required redesigning the entire braking systems of many trucks and tractor-trailers by increasing front brake torque and strengthening the brake design to enable the vehicles to meet the stopping distance requirements. 39 Fed. Reg. 7969 (1974). One manufacturer informed NHTSA that it was required to introduce 40,000 new part numbers in its system alone as the result of the Standard.[36] As new components—strong front axles, new brake linings, and mini-computers to control wheel lock and skid—were mass-produced, and subsequently put together in a unique combination, grave problems developed. There were complaints about electrical problems, relay valve failures, false warning signals, and

[35] 30 Fed. Reg. 17,552 (1974); NHTSA, A Procedure for Evaluating Vehicle Braking Performance (1971) (Contract HS-31-051); Testimony of G. Eads, Council on Wage and Price Stability, at TR-318 (Oct. 1975) (Doc. No. 75-16-No2-042).

[36] Letter from International Harvester Co. to NHTSA (1975) (Doc. 75-16-No2-005).

failures of the warning signal [37] required by NHTSA when antilock is used.[38] The agency was soon informed of a number of situations in which the warning light did not flash when the system was inoperable [39] and of other cases in which the warning light flashed continuously. The driver or fleet manager sometimes "solved" the latter problem simply by disconnecting the signal.[40] And we are informed that Greyhound Lines, anticipating the inevitable danger to its passengers from activating the antilock, simply disconnected the device when its newly equipped vehicles were delivered. Radio frequency interference (also called magnetic frequency interference) was an unanticipated problem,[41] causing the antilock to

[37] NHTSA, Listing of Safety Defect Recall Campaigns (1975) (Doc. No. 75-16-No2-010); Letter from ATA to NHTSA (Mar. 29, 1974) (Doc. No. 74-10-No1-014); Letter from NHTSA to Weyerhauser Co. (Mar. 8, 1976) (Doc. No. 75-16-No5-067); Testimony of Holly Farms Poultry Indus. at TR-176-78 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of Wesco Truck & Trailer Sales at TR-518-19.

[38] 41 Fed. Reg. 8786 (1976); 30 Fed. Reg. 7967 (1974).

[39] NHTSA, Listing of Safety Defect Recall Campaigns, *supra* note 37; Letter from Hy-Vee Food Stores to NHTSA (Mar. 1976) (Doc. No. 75-16-No2-173); Testimony of Leaseway Transp. Corp. at TR-231-33 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of Roadway Express at TR-269; Testimony of Freightliner Corp. at TR-296.

[40] Petition for Reconsideration, International Harvester Co. (Mar. 22, 1972) (Doc. No. N3 70-16-1).

[41] 41 Fed. Reg. 8787 (1976); 40 Fed. Reg. 59,228 (1975); Testimony of Rockwell Int'l Corp. at TR-150 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of General Motors Corp. at TR-361.

malfunction and the brakes to fail without warning.[42] This problem was still being encountered a year after the Standard had been made effective. When the antilock system failed, the high torque front brakes, in the opinion of the industry, created a serious safety problem.[43] Among the problems encountered were lateral instability, jackknifing, wheel lockup, and "pulling" to one side.[44]

Although the Act requires manufacturers to report all safety-related defects to NHTSA, 15 U.S.C. § 1411, manufacturers informed the agency that truck users did not always advise them of the problems. Consoli-

[42] NHTSA, Memo of Visit to International Harvester Co. (Mar. 12, 1976) (Doc. No. 75-16-No26-002); Report from Kelsey-Hayes Co. to NHTSA (Jan. 31, 1975) (Doc. No. 75E-031); Letter from NHTSA to Weyerhauser Co., *supra* note 37; Testimony of Freightliner Corp. at TR-296 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of General Motors Corp. at TR-361; Testimony of Kelsey-Hayes Co. at TR-391; Testimony of California Highway Patrol at TR-466. Citizens Band radio transmission is not a problem. Letter from NHTSA to Weyerhauser Co., *supra* note 37; Letter from NHTSA to Congressman Shuster (Sept. 17, 1975) (Doc. No. 75-16-No2-032).

[43] Letter from ATA to NHTSA (Mar. 25, 1975) (Doc. No. 74-10-No5-065); Letter from Ford Motor Co., *supra* note 16; Letter from General Motors Corp. to NHTSA (Apr. 1, 1974) (Doc. No. 74-10-No1-26); Letter from General Motors Corp., *supra* note 16; Testimony of Wilson Freight Co. at TR-211 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of Leaseway Transp. Corp. at TR-234; Testimony of Queens Transit Corp. and Steinway Transit Corp. at TR-510.

[44] NHTSA, Internal Progress Reports B-7 (1976) (Doc. No. 75-16-No2-183).

dated Freightway representatives testified that a spot check of their Standard 121-equipped trailers disclosed that 65% of the antilock devices malfunctioned.[45] General Motors reported that, despite instructions to their users to report defects, a spot check by the company revealed a 59% nonoperative rate for the antilock system.[46] In March, 1976, another survey, also by Consolidated Freightway at the request of the Subcommittee on Consumer Protection and Finance of the House Interstate and Foreign Commerce Committee, discovered that 48% of the trailers had malfunctioning antilocks.[47] The absolute number of vehicles represented by these figures is quite small. But in view of the testimony to NHTSA that drivers were disconnecting warning lights, that large numbers of antilock systems certified at the factory were malfunctioning upon delivery or within a short time after delivery,[48] and that malfunctions created a hazard, we think that the agency had a responsibility to examine the results of its rulemaking

[45] Testimony at TR-17-24 (Oct. 1975) (Doc. No. 75-16-No2-042).

[46] Letter from General Motors Corp. (Apr. 1, 1974), *supra* note 43.

[47] Letter from Consolidated Freightways, Inc. to the Secretary (Apr. 6, 1976) (NHTSA Reliability File No. 20).

[48] Letter from A-P-A Transport Corp. to NHTSA (Feb. 5, 1976) (Doc. No. 75-16-No2-010); Letter from J. P. Silvey Trucking to NHTSA (Oct. 7, 1975) (Doc. No. 75-16-No2-052); Testimony of Leaseway Transp. Corp. at TR-230 (Oct. 1975) (Doc. No. 75-16-No2-042); Testimony of Roadway Express at TR-276.

by investigating more fully the safety of vehicles *in use*.

Although NHTSA received requests to postpone the March, 1975, effective date, no further delay in the truck and tractor standard was allowed by the agency.[49] While we can understand the agency's reluctance again to delay the effective date, after having postponed it several times previously,[50] we agree with the Sixth Circuit that NHTSA has the responsibility to assure that the new systems it requires are reliable when placed in use. *Chrysler Corp.* v. *Department of Transp.*, 472 F.2d 659 (6th Cir. 1972). If, to accomplish that end, the industry demonstrates that it must be given more time to solve its start-up problems, the agency must revise its timetables. As the court stated in *Chrysler Corp.*:

> [S]hould it develop that, as the time for implementation of federally mandated devices approaches, such devices will require further testing or development, upon a showing to the Agency by the manufacturers or the developers the Agency should again review the matter and decide whether to extend the time for implementation or to alter, or even to abandon, the project.

Id. at 673.

[49] 40 Fed. Reg. 1248 (1975); 39 Fed. Reg. 40,168 (1974); 39 Fed. Reg. 39,880 (1974).

[50] 40 Fed. Reg. 1246 (1975); 39 Fed. Reg. 28,161 (1974); 30 Fed. Reg. 20,380 (1974); 39 Fed. Reg. 17,550 (1974); 37 Fed. Reg. 3905 (1972).

The Act requires that standards set by the agency protect the public against unreasonable risk of accidents "occurring as a result of the design, construction *or performance* of motor vehicles." 15 U.S.C. § 1391(1) (emphasis added). NHTSA has the power to determine whether performance conforms to theory through its mandate to research or contract for research, to do compliance testing, and to "conduct any inspection or investigation . . . which may be necessary to enforce" federal vehicle safety standards. 15 U.S.C. § 1401(a)(1). Yet, despite massive evidence presented to NHTSA that many vehicles equipped with antilocks were potentially more dangerous in performance than pre-Standard vehicles, the agency admitted during oral argument in July, 1976, that it had done no compliance testing since the Standard went into effect over a year earlier. Agency attorneys also admitted that prior to the effective date of the Standard, NHTSA had done no reliability testing of vehicles with Standard-121 components whatsoever, other than the testing reviewed in the Murphy Report,[51] which did not include stops at the higher speeds. For "proof" of the reliability of the system, the agency has relied only upon the testimony of some manufacturers,[52] the lack of reports of highway accidents "caused" by antilock,[53] and the results of test-

[51] Murphy Report, *supra* note 28.

[52] 41 Fed. Reg. 8785 (1976); 40 Fed. Reg. 5822 (1975); 39 Fed. Reg. 39,880 (1974); 39 Fed. Reg. 17,552 (1974).

[53] 39 Fed. Reg. 39,880 (1974).

ing a mere three 121-equipped tractor-trailers from June until September, 1975. But because antilock problems have appeared with usage rather than at the manufacturing stage, the foregoing methods employed by NHTSA to examine the validity of complaints were inadequate.[54] The agency has a heavy responsibility indeed, a responsibility to ascertain, with all reasonable probability, that its regulations do not produce a more dangerous highway environment than that which existed prior to governmental intervention. In view of substantial evidence received by NHTSA that the "in-use" performance of vehicles equipped with antilock was not consistent with the performance required by the Standard, and in some circumstances may have been more hazardous than the performance of pre-Standard vehicles, the agency's failure to conduct more intensive testing of trucks and tractor-trailers certified under the Standard was not only unreasonable, but, also, a legal abuse of its discretion.

There is much in the Standard that has long been needed for highway safety, and it is undisputed that the antilock device, when perfected, will advance that goal. We are also aware that some manufacturers have expended a great deal of time, energy, and money over the last six years, in attempting to pro-

[54] The agency's evidence does not even show whether the above-mentioned antilock defects occur only in certain models of the device or only when placed on a vehicle of a certain type or weight. This is one of the many gaps in NHTSA's proof that it must undertake to fill.

duce vehicles to comply, and that they have, to a large degree, been successful. However, the comprehensive data before us indicate that there is a strong probability that the performance of a substantial number of vehicles whose braking systems have been altered to include "overpowered" front axles and antilock devices has created a potentially more hazardous highway situation than existed before the Standard became operative. Therefore, until such time as NHTSA develops evidence that the new braking systems required by the Standard do not create the possibility of greater danger to the public, those parts of the Standard requiring heavier axles and the antilock device should be suspended. The evidence indicates that this can be accomplished if we hold, as we do, that the stopping distance requirements from 60 mph are invalid. The agency may, of course, continue to propose new standards, including the promulgation of new stopping distance requirements to replace those here invalidated. We hold only that more provative and convincing data evidencing the reliability and safety of vehicles that are equipped with antilock and in use must be available before the agency can enforce a standard requiring its installation.

TESTING REQUIREMENTS

To ensure compliance with the Standard, NHTSA has retained the right to test certified 121 vehicles on testing tracts with road surface skid numbers of 75 and 30. *See* 49 C.F.R. § 571.121. The skid number

represents the coefficient of friction between the tire and the road surface. It is a quantitative measure of the slickness of the road: skid number 75 represents a dry road, skid number 30 a wet road. Manufacturers whose vehicles fail NHTSA's tests and who cannot establish that their own testing procedures reflected due care are subject to administrative penalties. Furthermore, nonconforming vehicles are subject to the recall and repair provisions of 15 U.S.C. § 1400(a). Petitioners raise several objections to NHTSA's testing procedures.

Petitioners argue that the skid numbers of 75 and 30 are ill-chosen. We agree. The skid numbers are based on a mathematical calculation that assumes the use of a particular tire. It is uncontroverted that the particular tire is no longer produced and that the use of available tires produces different results.[55] It is also uncontroverted that there was a mathematical error in the original formula for determining the skid numbers.[56]

Petitioners also raise a more basic objection to the skid number method of testing stopping distances. They assert that the method is neither "objective" nor "practicable," as required by 15 U.S.C. § 1392(a), because the skid number of a given surface varies over time and with use.[57]

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[55] NHTSA, Braking Systems (Apr. 1975) (Doc. No. 75-27-GR-001).

[56] *Id.*

[57] Letter from Mack Truck to NHTSA (July 1975) (Doc. No. 75-16-No1-023).

We cannot agree that the test is not "objective." The fact that it is difficult to create and thereafter maintain a road surface with a particular coefficient of friction does not render the specified coefficient any less objective. The Sixth Circuit, in examining an attack on the same testing regulations, defined an objective standard as one whose testing procedures are "capable of producing identical results when test conditions are exactly duplicated, that they be decisively demonstrable by performing a rational test procedure, and that compliance is based upon readings obtained from measuring instruments as opposed to the subjective opinions of human beings." *Chrysler Corp.* v. *Department of Transp.*, 472 F.2d 659, 676 (6th Cir. 1972) (footnote omitted). The skid number method of testing braking capacity meets this definition. Identical results will ensue when test conditions are exactly duplicated. The procedure is rational and decisively demonstrable. Compliance is based on objective measures of stopping distances rather than on the subjective opinions of human beings.

We do agree with petitioners, however, that NHTSA's testing procedure is not "practicable." The fluctuations in skid numbers on a given road surface make it impracticable for manufacturers to conduct tests that will assure that their vehicles will exactly meet the objective standard when tested by NHTSA. Their only recourse will be, not simply to comply with the stated standard, but to overcompensate by testing

their vehicles on road surfaces substantially slicker than official regulations require.

NHTSA responds that it has met this objection by testing compliance on a road surface substantially more sticky (skid number 85) than required by the Standard (skid number 75), thus allowing a margin sufficient to compensate for any variance in the skid number road surfaces used by manufacturers. These informal assurances are not enough. Manufacturers are entitled to testing criteria that they can rely upon with certainty.

In the same vein, petitioners complain that NHTSA has not specified the time intervals between tests, the duration of permissible wheel lockup during tests, and the amount of curving in testing track roadways. Again NHTSA responds with informal assurances that it will act reasonably in performing its tests. In these respects also the manufacturers are entitled to formal and reasonably specific testing criteria.

Petitioners' argument that NHTSA should promulgate a regulation formalizing its informal agreement to test vehicles with a load that is within the "center of gravity envelope" of the vehicle [58] has been mooted during the pendency of these proceedings. In May of 1975 NHTSA promulgated just such a regulation. 40 Fed. Reg. 21,032 (1975).

TEBDA's challenge to the certification requirements of the Standard is also moot. TEBDA repre-

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[58] Letter from NHTSA to Trailmobile Corp. (May 8, 1976) (Doc. No. 75-16-No7-007).

sents approximately half of the "intermediate" and "final stage" manufacturers in this country. The "first stage" or "incomplete" manufacturers build the truck chassis, and TEBDA members modify that chassis to produce dump trucks, cement trucks, garbage trucks, and other trucks. TEBDA complained that chassis-cab manufacturers were not required to certify their work and that, as a result, TEBDA members were forced to certify work over which they have had no control. During the pendency of these proceedings NHTSA modified its regulations to require chassis-cab manufacturers to certify that their vehicles will conform to the standard if completed in accordance with specified instructions. *See* 42 Fed. Reg. 37,814-18 (1977) (to be codified in 49 C.F.R. §§ 567, 568); 40 Fed. Reg. 45,847-49 (1975).

TEBDA also challenges as not "practicable" the road testing procedure set out at great length at 49 C.F.R. § 571.121. It is undisputed that it would be economically unfeasible for TEBDA members to road test each vehicle they complete.[59] TEBDA argues, however, that its manufacturers run the risk of violating the "due care" provision of 15 U.S.C. § 1397 (a)(1)(C) if they do not road test, since road testing is the only method NHTSA has specified whereby manufacturers can ensure that their vehicles are properly certified.

[59] There are only four test tracks in the United States, and the cost of testing each vehicle is between $2000 and $4000. Letter from NHTSA to the Honorable Warren G. Magnuson (May 1975).

NHTSA asserts that road testing is not required of the manufacturers, and it is only necessary that any truck manufactured meet the test that it performs. According to the agency, due care could be satisfied by any number of alternative methods, such as group testing, mathematical calculations, and so forth.[60] TEBDA contends that, since such alternatives are not contained in the regulations, its manufacturers have no assurance that these alternatives will ultimately be found to comply with the due care requirement.

In our opinion, the plain statutory mandate of "practicability" and "objectivity" is not met by agency "suggestions" of what might constitute compliance with the amorphous due care standard. Since NHTSA has admitted that road testing is beyond the practical and financial reach of the final stage manufacturers, it must propose some alternative method for those manufacturers which, if followed, it will recognize as fulfilling the due care requirement.

Our decision in no way invalidates the testing procedures, nor does it affect the requirement that each vehicle sold to a distributor or dealer must conform to a legally appropriate standard. 15 U.S.C. § 1400. We hold only that this regulation is neither "objective" nor "practicable" because it could subject intermediate and final stage manufacturers to the pen-

[60] Letter from NHTSA to TEBDA (Apr. 16, 1976); Letter from NHTSA to TEBDA (Mar. 6, 1975) (denial of Petition for Rehearing); NHTSA References.

alties of 15 U.S.C. § 1397 simply because they could not perform the only procedure specified in the regulations for fulfilling the due care provision. Statutes prescribing penalties, civil or criminal, must be drafted without ambiguity. Successive authorities of NHTSA might take an entirely different view than that announced by the incumbents, and subjecting the manufacturers to such a risk does not comport with due process requirements.

We have concluded that numerous other issues raised by petitioners are without merit.

The cause is remanded to the Respondent for further proceedings not inconsistent with the views herein expressed.

SO ORDERED.

APPENDIX B

UNITED STATES COURT OF APPEALS
FOR THE NINTH CIRCUIT

Nos. 75-1017, 75-2831 and 75-3182

PACCAR, INC., PETITIONER,

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION and DEPARTMENT OF TRANSPORTATION, RESPONDENTS.

TRUCK EQUIPMENT & BODY DISTRIBUTORS ASSOCIATION, PETITIONER,

v.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION, ET AL., RESPONDENTS.

AMERICAN TRUCKING ASSOCIATIONS, INC., PETITIONER,

v.

N.H.T.S.A., RESPONDENT.

JUDGMENT

Upon Petition to Review a Decision of the National Highway Traffic Safety Administration, Department of Transportation.

This Cause came on to be heard on the Transcript of the Record from The National Highway Traffic Safety Administration, Department of Transportation and was duly submitted.

On Consideration Whereof, it is now here ordered and adjudged by this Court, that the Decision of the said N.H.T.S.A. in this Cause be, and hereby is REMANDED for further proceedings.

Filed and entered April 17, 1978.

APPENDIX C

National Highway Traffic and Motor Vehicle Safety Act of 1966, 80 Stat. 718, as amended, 15 U.S.C. (1976 ed.) 1381 *et seq.*:

15 U.S.C. 1381:

Congress hereby declares that the purpose of this chapter is to reduce traffic accidents and deaths and injuries to persons resulting from traffic accidents. Therefore, Congress determines that it is necessary to establish motor vehicle safety standards for motor vehicles and equipment in interstate commerce; to undertake and support necessary safety research and development; and to expand the national driver register.

15 U.S.C. 1392:

(a) *Establishment*

The Secretary shall establish by order appropriate Federal Motor vehicle safety standards. Each such Federal motor vehicle safety standard shall be practicable, shall meet the need for motor vehicle safety, and shall be stated in objective terms.

(b) *Applicability of administrative procedure provisions*

Subchapter II of chapter 5, and chapter 7, of title 5 shall apply to all orders establishing, amending, or revoking a Federal motor vehicle safety standard under this subchapter.

(c) *Effective date of orders*

Each order establishing a Federal motor vehicle safety standard shall specify the date such

standard is to take effect which shall not be sooner than one hundred and eighty days or later than one year from the date such order is issued, unless the Secretary finds, for good cause shown, that an earlier or later effective date is in the public interest, and publishes his reasons for such finding.

* * * * *

(e) *Amendment and revocation of standards*

The Secretary may by order amend or revoke any Federal motor vehicle safety standard established under this section. Such order shall specify the date on which such amendment or revocation is to take effect which shall not be sooner than one hundred and eighty days or later than one year from the date the order is issued, unless the Secretary finds, for good cause shown, that an earlier or later effective date is in the public interest, and publishes his reasons for such finding.

(f) *Factors to be considered in prescribing standards*

In prescribing standards under this section, the Secretary shall—

(1) consider relevant available motor vehicle safety data, including the results of research, development, testing and evaluation activities conducted pursuant to this chapter;

(2) consult with the Vehicle Equipment Safety Commission and such other State or interstate agencies (including legislative committees) as he deems appropriate;

(3) consider whether any such proposed standard is reasonable, practicable and appropriate for the particular type of motor vehicle or item of motor vehicle equipment for which it is prescribed; and

(4) consider the extent to which such standards will contribute to carrying out the purposes of this chapter.

15 U.S.C. 1394:

(a) (1) In a case of actual controversy as to the validity of any order under section 1392 of this title, any person who will be adversely affected by such order when it is effective may at any time prior to the sixtieth day after such order is issued file a petition with the United States court of appeals for the circuit wherein such person resides or has his principal place of business, for a judicial review of such order. A copy of the petition shall be forthwith transmitted by the clerk of the court to the Secretary or other officer designated by him for that purpose. The Secretary thereupon shall file in the court the record of the proceedings on which the Secretary based his order, as provided in section 2112 of title 28.

(2) If the petitioner applies to the court for leave to adduce additional evidence, and shows to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for the failure to adduce such evidence in the proceeding before the Secretary, the court may

order such additional evidence (and evidence in rebuttal thereof) to be taken before the Secretary, and to be adduced upon the hearing, in such manner and upon such terms and conditions as to the court may seem proper. The Secretary may modify his findings as to the facts, or make new findings, by reason of the additional evidence so taken, and he shall file such modified or new findings, and his recommendation, if any, for the modification or setting aside of his original order, with the return of such additional evidence.

(3) Upon the filing of the petition referred to in paragraph (1) of this subsection, the court shall have jurisdiction to review the order in accordance with chapter 7 of title 5 and to grant appropriate relief as provided in such section.

(4) The judgment of the court affirming or setting aside, in whole or in part, any such order of the Secretary shall be final, subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of title 28.

(5) Any action instituted under this subsection shall survive, notwithstanding any change in the person occupying the office of Secretary or any vacancy in such office.

(6) The remedies provided for in this subsection shall be in addition to and not in

substitution for any other remedies provided by law.

(b) A certified copy of the transcript of the record and proceedings under this section shall be furnished by the Secretary to any interested party at his request, and payment of the costs thereof, and shall be admissible in any criminal, exclusion of imports, or other proceeding arising under or in respect of this subchapter, irrespective of whether proceedings with respect to the order have previously been initiated or become final under subsection (a) of this section.

15 U.S.C. 1395:

(a) *Scope of research*

The Secretary shall conduct research, testing, development, and training necessary to carry out the purposes of this subchapter, including, but not limited to—

(1) collecting data from any source for the purpose of determining the relationship between motor vehicle or motor vehicle equipment performance characteristics and (A) accidents involving motor vehicles, and (B) the occurrence of death, or personal injury resulting from such accidents;

(2) procuring (by negotiation or otherwise) experimental and other motor vehicles or motor vehicle equipment for research and testing purposes;

(3) selling or otherwise disposing of test motor vehicles and motor vehicle equipment

and reimbursing the proceeds of such sale or disposal into the current appropriation available for the purpose of carrying out this subchapter.

(b) *Grants for research*

The Secretary is authorized to conduct research, testing, development, and training as authorized to be carried out by subsection (a) of this section by making grants for the conduct of such research, testing, development, and training to States, interstate agencies, and nonprofit institutions.

15 U.S.C. 1397:

(a)(1) No person shall—

(A) manufacture for sale, sell, offer for sale, or introduce or deliver for introduction in interstate commerce, or import into the United States, any motor vehicle or item of motor vehicle equipment manufactured on or after the date any applicable Federal motor vehicle safety standard takes effect under this subchapter unless it is in conformity with such standard except as provided in subsection (b) of this section;

* * * * *

(C) fail to issue a certificate required by section 1403 of this title or issue a certificate to the effect that a motor vehicle or item of motor vehicle equipment conforms to all applicable Federal motor vehicle safety standards, if such person in the exercise of

due care has reason to know that such certificate is false or misleading in a material respect;

15 U.S.C. 1398:

(a) Whoever violates any provision of section 1397 of this title, or any regulation issued thereunder, shall be subject to a civil penalty of not to exceed $1,000 for each such violation. Such violation of a provision of section 1397 of this title, or regulations issued thereunder, shall constitute a separate violation with respect to each motor vehicle or item of motor vehicle equipment or with respect to each failure or refusal to allow or perform an act required thereby, except that the maximum civil penalty shall not exceed $800,000 for any related series of violations.

(b) Any such civil penalty may be compromised by the Secretary. In determining the amount of such penalty, or the amount agreed upon in compromise, the appropriateness of such penalty to the size of the business of the person charged and the gravity of the violation shall be considered. The amount of such penalty, when finally determined, or the amount agreed upon in compromise, may be deducted from any sums owing by the United States to the person charged.

15 U.S.C. 1403:

Every manufacturer or distributor of a motor vehicle or motor vehicle equipment shall furnish

to the distributor or dealer at the time of delivery of such vehicle or equipment by such manufacturer or distributor the certification that each such vehicle or item of motor vehicle equipment conforms to all applicable Federal motor vehicle safety standards. In the case of an item of motor vehicle equipment such certification may be in the form of a label or tag on such item or on the outside of a container in which such item is delivered. In the case of a motor vehicle such certification shall be in the form of a label or tag permanently affixed to such motor vehicle.

15 U.S.C. 1411:

If a manufacturer—

(1) obtains knowledge that any motor vehicle or item of replacement equipment manufactured by him contains a defect and determines in good faith that such defect relates to motor vehicle safety; or

(2) determines in good faith that such vehicle or item of replacement equipment does not comply with an applicable Federal motor vehicle safety standard prescribed pursuant to section 1392 of this title;

he shall furnish notification to the Secretary and to owners, purchasers, and dealers, in accordance with section 1413 of this title, and he shall remedy the defect or failure to comply in accordance with section 1414 of this title.

15 U.S.C. 1414:

(a) *Manner of remedying defect or failure to comply*

(1) If notification is required under section 1411 of this title or by an order under section 1412(b) of this title, with respect to any motor vehicle or item of replacement equipment which fails to comply with an applicable Federal motor vehicle safety standard or contains a defect which relates to motor vehicle safety, then the manufacturer of each such motor vehicle or item of replacement equipment presented for remedy pursuant to such notification shall cause such defect or failure to comply in such motor vehicle or such item of replacement equipment to be remedied without charge. In the case of notification required by an order under section 1412(b) of this title, the preceding sentence shall not apply during any period during which enforcement of the order has been restrained in an action to which section 1415(a) of this title applies or if such order has been set aside in such an action.

(2)(A) In the case of a motor vehicle presented for remedy pursuant to such notification, the manufacturer (subject to subsection (b) of this section) shall cause the vehicle to be remedied by whichever of the following means he elects:

(i) By repairing such vehicle.

(ii) By replacing such motor vehicle without charge, with an identical or reasonably equivalent vehicle.

(iii) By refunding the purchase price of such motor vehicle in full, less a reasonable allowance for depreciation.

Replacement or refund may be subject to such conditions imposed by the manufacturer as the Secretary may permit by regulation.

(B) In the case of an item of replacement equipment the manufacturer shall (at his election) cause either the repair of such item of replacement equipment, or the replacement of such item of replacement equipment without charge with an identical or reasonably equivalent item of replacement equipment.

(3) The dealer who effects remedy pursuant to this section without charge shall receive fair and equitable reimbursement for such remedy from the manufacturer.

APPENDIX D

FEDERAL MOTOR VEHICLE SAFETY STANDARD NO. 121

(49 C.F.R. 571.121 *et seq.*)

S1. *Scope.* This standard establishes performance and equipment requirements for braking systems on vehicles equipped with air brake systems.

S2. *Purpose.* The purpose of this standard is to insure safe braking performance under normal and emergency conditions.

S3. *Application.* This standard applies to trucks, buses, and trailers equipped with air brake systems. However, it does not apply to a fire fighting vehicle manufactured before June 1, 1976, or a heavy hauler trailer manufactured before September 1, 1977, or to any vehicle manufactured before September 1, 1977, that has a gross axle weight rating (GAWR) for any axle of 24,000 pounds or more, two or more front steerable axles with a GAWR of 16,000 pounds or more for each axle, or to any vehicle which, in combination with another vehicle, constitutes a part of an "auto transporter" as defined in S4.

In addition, the standard does not apply to any trailer whose unloaded vehicle weight is not less than 95 percent of its GVWR, or any vehicle that meets any one of criteria (a) through (d), as follows:

(a) An overall vehicle width of 108 inches or more;

(b) An axle that has a GAWR of 29,000 pounds or more;

(c) A speed attainable in 2 miles of not more than 33 mph; or

(d)(1) A speed attainable in 2 miles of not more than 45 mph; and

(2) An unloaded vehicle weight that is not less than 95 percent of the vehicle GVWR; and

(3) No passenger-carrying capacity.

S4. *Definitions.*

"Air brake system" means a system that uses air as a medium for transmitting pressure or force from the driver control to the service brake, but does not include a system that uses compressed air or vacuum only to assist the driver in applying muscular force to hydraulic or mechanical components.

"Antilock system" means a portion of a service brake system that automatically controls the degree of rotational wheel slip at one or more road wheels of the vehicle during braking.

"Heavy hauler trailer" means a trailer with one or more of the following characteristics:

(1) Its brake lines are designed to adapt to separation or extension of the vehicle frame; or

(2) Its body consists only of a platform whose primary cargo-carrying surface is not more than 40 inches above the ground in an unloaded condition, except that it may include sides that are designed to be easily removable and a permanent "front-end structure" as that term is used in § 393.106 of this title.

"Auto transporter" means a truck and a trailer designed for use in combination to transport motor vehicles, in that the towing vehicle is designed to carry cargo at a location other than the fifth wheel and to load this cargo only by means of the towed vehicle.

"Speed attainable in 2 miles" means the speed attainable by accelerating at maximum rate from a standing start for 2 miles on a level surface.

"Skid number" means the frictional resistance of a payment measured in accordance with American Society for Testing and Materials Method E-274-65T at 40 m.p.h., omitting water delivery as specified in paragraph 7.1 of that method.

S5. *Requirements.* Each vehicle shall meet the following requirements under the conditions specified in S6.

S5.1 *Required equipment—trucks and buses.* Each truck and bus shall have the following equipment:

S5.1.1 *Air compressor.* An air compressor of sufficient capacity to increase air pressure in the supply and service reservoirs from 85 pounds per square inch (p.s.i.) to 100 p.s.i. when the engine is operating at the vehicle manufacturer's maximum recommended r.p.m. within a time, in seconds, determined by the quotient.

$$\frac{\text{Actual reservoir capacity X 25}}{\text{Required reservoir capacity}}$$

S5.1.2 *Reservoirs.* One or more service reservoir systems, from which air is delivered to the brake

chambers, and either an automatic condensate drain valve for each service reservoir or a supply reservoir between the service reservoir system and the source of air pressure.

S5.1.2.1 The combined volume of all service reservoirs and supply reservoirs shall be at least 12 times the combined volume of all service brake chambers at maximum travel of the pistons or diaphragms.

S5.1.2.2 Each reservoir shall be capable of withstanding an internal hydrostatic pressure of five times the compressor output pressure or 500 p.s.i., whichever is greater, for 10 minutes.

S5.1.2.3 Each service reservoir system shall be protected against loss of air pressure due to failure or leakage in the system between the service reservoir and the source of air pressure, by check valves or equivalent devices whose proper functioning can be checked without disconnecting any air line or fitting.

S5.1.2.4 Each reservoir shall have a condensate drain valve that can be manually operated.

S5.1.3 *Towing vehicle protection system.* If the vehicle is intended to tow another vehicle equipped with air brakes, a system to protect the air pressure in the towing vehicle from the effects of a loss of air pressure in the towed vehicle.

S5.1.4 *Pressure gauge.* A pressure gauge in each service brake system, readily visible to a person seated in the normal driving position, that indicates the service reservoir system air pressure. The accuracy of the gauge shall be within plus or minus 7 percent of the compressor cutout pressure.

S5.1.5 *Warning signal.* A signal, other than a pressure gauge, that gives a continuous warning to a person in the normal driving position when the ignition is in the "on" or "run" position and the air pressure in the service reservoir system is below 60 p.s.i. The signal shall be either visible within the driver's forward field of view, or both audible and visible.

S5.1.6 *Antilock warning signal.* A signal on each vehicle equipped with an antilock system that gives a continuous warning to a person in the normal driving position when the ignition is in the "on" or "run" position in the event of a total electrical failure of the antilock system. The signal shall be either visible within the driver's forward field of view or both audible, for a duration of at least 10 seconds, and continuously visible. The signal shall operate in the specified manner each time the ignition is returned to the "on" or "run" position.

S5.1.7 *Service brake stop lamp switch.* A switch that lights the stop lamps when the service brake control is statistically depressed to a point that produces a pressure of 6 p.s.i. or less in the service brake chambers.

S5.2 *Required equipment-trailers.* Each trailer shall have the following equipment:

S5.2.1 *Reservoirs.* One or more reservoirs to which the air is delivered from the towing vehicle.

S5.2.1.1 A reservoir shall be provided that is capable, when pressurized to 90 p.s.i., of releasing the

vehicle's parking brakes at least once and that is unaffected by a loss of air pressure in the service brake system.

S5.2.1.2 Total service reservoir volume shall be at least eight times the combined volume of all service brake chambers at maximum travel of the pistons or diaphragms.

S5.2.1.3 Each reservoir shall be capable of withstanding an internal hydrostatic pressure of 500 p.s.i. for 10 minutes.

S5.2.1.4 Each reservoir shall have a condensate drain valve that can be manually operated.

S5.2.1.5 Each service reservoir shall be protected against loss of air pressure due to failure or leakage in the system between the service reservoir and its source of air pressure by check valves or equivalent devices.

S5.3 *Service brakes-road tests.* The service brake system on each truck and bus shall, under the conditions of S6.1, meet the requirements of S5.3.1, S5.3.3, and S5.3.4 when tested without adjustments other than those specified in this standard. The service brake system on each trailer shall, under the conditions of S6.1, meet the requirements of S5.3.2, S5.3.3, and S5.3.4 when tested without adjustments other than those specified in this standard.

However, the truck and trailer portions of an auto transporter (if both are manufactured after September 1, 1976), shall, in combination, meet the requirements of S5.3.1 as they apply to a single unit

truck or bus, in place of the requirements of S5.3.2 as they apply to the trailer portion, and in place of the requirements of S5.3.1 as they apply to the truck portion in the loaded condition.

S5.3.1 *Stopping distance-trucks and buses.* Except for a bus manufactured before January 1, 1977, and except as provided in S5.3.1.2 and S5.3.1.3, when stopped six times for each combination of weight, speed, and road condition specified in S5.3.1.1, in the sequence specified in Table I, the vehicle shall stop at least once in not more than the distance specified in Table II, measured from the point at which movement of the service brake control begins, without any part of the vehicle leaving the roadway and without lockup of any wheel at speeds above 10 mph except for:

(a) Controlled lockup of wheels allowed by an anti-lock system, or

(b) Lockup of wheels on nonsteerable axles other than the two rearmost nonliftable, nonsteerable axles on a vehicle with more than two nonsteerable axles.

S5.3.1.1 Stop the vehicle from 60 m.p.h. and 20 m.p.h. on a surface with a skid number of 75, and from 20 m.p.h. on a wet surface with a skid number of 30, with the vehicle (a) loaded to its gross vehicle weight rating, and (b) at its unloaded vehicle weight plus 500 pounds (including driver and instrumentation). If the speed attainable in 2 miles is less than 60 m.p.h., the vehicle shall stop from a speed in Table II that is 4 to 8 m.p.h. less than the speed attainable in 2 miles.

TABLE I—STOPPING SEQUENCE

1. Burnish.
2. Control trailer service brake stops at 60 mi/h (for truck-tractors tested with a control trailer in accordance with S6.1.10.6).
3. Control trailer emergency brake stops at 60 mi/h (for truck-tractors tested with a control trailer in accordance with S6.1.10.7).
4. Stops with vehicle at gross vehicle weight rating:
   (a) 20 mi/h service brake stops on skid number of 75.
   (b) 60 mi/h service brake stops on skid number of 75.
   (c) 20 mi/h service brake stops on skid number of 30.
   (d) 20 mi/h emergency brake stops on skid number of 75.
   (e) 60 mi/ emergency brake stops on skid number of 75.
5. Parking brake test with vehicle loaded to gross vehicle weight rating.
6. Stops with vehicle at unloaded weight plus 500 lb.:
   (a) 20 mi/h service brake stops on skid number of 75.
   (b) 60 mi/h service brake stops on skid number of 75.
   (c) 20 mi/h service brake stops on skid number of 30.
   (b) 20 mi/h emergency brake stop on skid number of 75.
   (e) 60 mi/h emergency brake stops on skid number of 75.
7. Parking brake test with vehicle at unloaded weight plus 500 lb.

S5.3.1.2 When stopped in accordance with S5.3.1, with its brakes fully applied, a truck manufactured before September 1, 1977, that has a front steerable non-driving axle with a GAWR of 16,000 pounds or more, or a front steerable drive axle with a GAWR of less than 18,000 pounds, and a truck manufactured before September 1, 1975, that has a front steerable drive axle of any GAWR, need not meet the requirement that it stop in the distance specified in Table II

TABLE II—STOPPING DISTANCE FEET

Vehicle speed in miles per hour	Service brake		Emergency brake, skid No. 75	
	Skid No. 75 (1)	Skid No. 30 (2)	(3)	(4)
20	35	60	83	85
25	53	—	123	131
30	75	—	170	186
35	101	—	225	250
40	131	—	288	325
45	165	—	358	400
50	203	—	435	504
55	246	—	520	608
60	293	—	613	720

for stops on a surface with a skid number of 75 if the brakes on its front axle conform to the retardation formula and Column 1 values of S5.4.1. These vehicles must nevertheless meet the requirements of staying within the 12-foot lane and those relating to wheel lock-up.

S5.3.2 *Stopping capability-trailers.* When tested at each combination of weight, speed, and road condition specified in S5.3.2.1, in the sequence specified in Table I, with air pressure of 90 p.s.i. in the control line and service reservoir system and with no application of the towing vehicle's brakes, a trailer shall stop without any part of the trailer leaving the roadway and without lockup of any wheel at speeds above 10 mph, except for

(a) Controlled lockup of wheels allowed by an antilock system, or

(b) Lockup of wheels on nonsteerable axles other than the two rearmost nonliftable, nonsteerable axles on a trailer with more than two nonsteerable axles.

S5.3.2.1 Stop the vehicle from 60 m.p.h. and 20 m.p.h. on a surface with skid number of 75, and from 20 m.p.h. on a wet surface with a skid number of 30, with the vehicle (a) loaded to its gross vehicle weight rating, and (b) at its unloaded vehicle weight plus 500 pounds (including instrumentation).

S5.3.3 *Brake actuation time.* With an initial service reservoir system air pressure of 100 psi, the air pressure in each brake chamber shall, when measured from the first movement of the service brake control, reach 60 psi in not more than 0.45 seconds in the case of trucks and buses, 0.35 seconds in the case of trailer converter dollies. A vehicle designed to tow a vehicle equipped with air brakes shall be capable of meeting the above actuation time requirement with a 50-cubic-inch test reservoir connected to the control line coupling. A trailer, including a trailer converter dolly, shall meet the above actuation time requirement with its brake system connected to the test rig shown in Figure 1.

S5.3.4 *Brake release time.* With an initial service brake chamber air pressure of 95 psi, the air pressure in each brake chamber shall, when measured from the first movement of the service brake control, fall to 5 psi in not more than 0.55 seconds in the case of trucks and buses, and fall to 5 psi in not more than 0.65 seconds in the case of trailers, including trailer

convertible dollies. A vehicle designed to tow another vehicle equipped with air brakes shall be capable of meeting the above release time requirement with a 50-cubic-inch test reservoir connected to the control line coupling. A trailer, including a trailer converter dolly, shall meet the above release time requirements with its brake system connected to the test rig shown in Figure 1.

S5.4 *Service brake system-dynamometer tests.* When tested without prior road testing, under the conditions of S6.2, each brake assembly shall meet the requirements of S5.4.1, S5.4.2, and S5.4.3 when tested in sequence and without adjustments other than those specified in the standard. For purposes of the requirements of S5.4.2, and S5.4.3, an average deceleration rate is the change in velocity divided by the deceleration time measured from the onset of deceleration.

S5.4.1 *Brake retardation force.* The sum of the retardation forces exerted by the brakes on each vehicle designed to be towed by another vehicle equipped with air brakes shall be such that the quotient

$$\frac{\text{sum of the brake retardation forces}}{\text{sum of GAWR}}$$

relative to brake chamber air pressure, shall have values not less than those shown in Column 1 of Table III. Retardation force shall be determined as follows:

S5.4.1.1 After burnishing the brake pursuant to S6.2.6, retain the brake assembly on the inertia dynamometer. With an initial brake temperature between 125°F. and 200°F., conduct a stop from 50 m.p.h., maintaining brake chamber air pressure at a constant 20 p.s.i. Measure the average torque exerted by the brake from the time the specified air pressure is reached until the brake stops and divide by the static loaded tire radius specified by the tire manufacturer to determine the retardation force. Repeat the procedure six times, increasing p.s.i. each time. After each stop, rotate the brake drum or disc until the temperature of the brake falls to between 125°F. and 200°F.

S5.4.2 *Brake power.* When mounted on an inertia dynamometer, each brake shall be capable of making 10 consecutive decelerations at an average rate of 9 f.p.s.p.s. from 50 m.p.h. to 15 m.p.h., at equal intervals of 72 seconds, and shall be capable of decelerating to a stop from 20 m.p.h. at an average deceleration rate of 14 f.p.s.p.s. 1 minute after the 10th deceleration. The series of decelerations shall be conducted as follows:

S5.4.2.1 With an initial brake temperature between 150°F. and 200°F. for the first brake application, and the drum or disc rotating at a speed equivalent to 50 m.p.h., apply the brake and decelerate at an average deceleration rate of 9 f.p.s.p.s. to 15 m.p.h. Upon reaching 15 m.p.h., accelerate to 50 m.p.h. and apply the brake for a second time 72 seconds after the start of the first application. Repeat the cycle until 10 decelerations have been made. The

service line air pressure shall not exceed 90 p.s.i. during any deceleration.

S5.4.2.2 One minute after the end of the last deceleration required by S5.4.2.1 and with the drum or disc rotating at a speed of 20 m.p.h., decelerate to a stop at an average deceleration rate of 14 f.p.s.p.s. The service brake line air pressure shall not exceed 100 p.s.i. during any deceleration.

S5.4.2.2 One minute after the end of the last deceleration required by S5.4.2.1 and with the drum or disc rotating at a speed of 20 m.p.h., decelerate to a stop at an average deceleration rate of 14 f.p.s.p.s.

S5.4.3 *Brake recovery.* Starting 2 minutes after completing the tests required by S5.4.2, the brake of a vehicle other than either front axle brake of a truck-tractor shall be capable of making 20 consecutive stops from 30 mph at an average deceleration rate of 12 f.p.s.p.s., at equal intervals of 1 minute measured from the start of each brake application. The service line air pressure needed to attain a rate of 12 f.p.s.p.s. shall be not more than 85 psi, and not less than 20 psi for a brake not subject to the control of an antilock system, or 12 psi for brake subject to the control of an antilock system.

S5.5 *Antilock system.*

S5.5.1 *Antilock system failure.* On a vehicle equipped with an antilock system, electrical failure of any part of the antilock system shall not increase the actuation and release times of the service brakes.

FIGURE 1

TRAILER TEST RIG

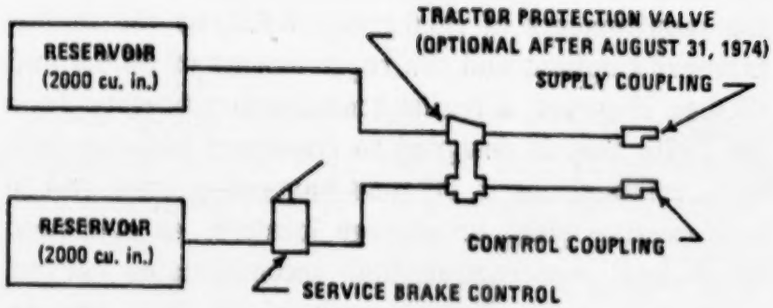


TABLE III—BRAKE RETARDATION FORCE

Brake retardation force, GAWR Col. 1	Brake chamber pressure, psi, Col. 2
0.05	20
0.12	30
0.18	40
0.25	50
0.31	60
0.37	70
0.41	80

S5.5.2 *Antilock system power-trailers.* On a trailer equipped with an antilock system that requires electrical power for operation, the power shall be obtained from the stop lamp circuit. Additional cir-

cuits may also be used to obtain redundant sources of electrical power.

S5.6 *Parking brake system.* Each vehicle other than a trailer converter dolly shall have a parking brake system that under the conditions of S6.1 meets the requirements of S5.6.1 or S5.6.2, at the manufacturer's option, and the requirements of S5.6.3 and S5.6.4. However, a trailer manufactured before June 30, 1976, that is designed to transport bulk agricultural commodities in off-road harvesting sites and to a processing plant or storage location, as evidenced by skeletal construction that accommodates harvest containers, a maximum length of 28 feet, and an arrangement of air control lines and reservoirs that minimizes damage in field operations, shall meet the requirements of this section or, at the option of the manufacturer, the requirements of § 393.43 of this title.

S5.6.1 *Static retardation force.* With all other brakes rendered inoperative, during a static drawbar pull in a forward or rearward direction, the static retardation force produced by the application of the parking brakes shall be:

(a) In the case of a vehicle other than a truck-tractor that is equipped with more than two axles, such that the quotient

$$\frac{\textit{static retardation force}}{\text{GAWR}}$$

is not less than 0.28 for any axle other than a steerable front axle; and

(b) In the case of a truck-tractor that is equipped with more than two axles, such that the quotient

$$\frac{\textit{static retardation force}}{\text{GAWR}}$$

is not less than 0.14.

S5.6.2 *Grade holding.* With all parking brakes applied, the vehicle shall remain stationary facing uphill and facing downhill in a smooth, dry portland cement concrete roadway with a 20-percent grade, both (a) when loaded to its gross vehicle weight rating, and (b) at its unloaded vehicle weight plus 500 pounds (including driver and instrumentation).

S5.6.3 *Application and holding.* The parking brakes shall be applied by an energy source that is not affected by loss of air pressure or brake fluid pressure in the service brake system. Once applied, the parking brakes shall be held in the applied position solely by mechanical means.

S5.6.4 *Parking brake control-trucks and buses.* The parking brake control shall be separate from the service brake control. It shall be operable by a person seated in the normal driving position. The control shall be identified in a manner that specifies the method of control operation. The parking brake control shall control the parking brakes of the vehicle and of any air braked vehicle that it is designed to tow.

S5.7 *Emergency braking capability-trucks and buses.* Each truck and bus shall have a braking system with emergency braking capability that meets the requirements of S5.7.1, or, at the manufacturer's option, the requirements of S5.7.2.

S5.7.1 *Parking brake system with automatic application.* Each vehicle shall have a parking brake system acting on each axle, except steerable front axles, that conforms to S5.6 and that meets the following requirements:

S5.7.1.1 *Automatic application.* The parking brakes shall be automatically applied and the supply line to any towed vehicle vented to atmospheric pressure when the air pressure in all service reservoirs is less than the automatic application pressure level. The automatic application pressure level shall be between 20 and 45 p.s.i.

S5.7.1.2 *Automatic braking performance.* With the parking brake automatically applied, a vehicle shall either be capable of meeting the requirements of S5.7.2.3, with distances measured from the point of automatic application, or shall have a static retardation force quotient not greater than 0.40 for any axle, determined in accordance with S5.6.1.

S5.7.1.3 *Release after automatic application.* After automatic application, the parking brakes shall be releasable at least once by means of a parking brake control. The parking brakes shall be releasable only if they can be automatically reapplied and exert the force required by S5.6 immediately after release.

S5.7.1.4 *Manual operation.* The parking brakes shall be manually operable and releasable when the air pressure in the service reservoir system is sufficient to keep the parking brakes from automatically applying.

S5.7.2 *Modulated emergency braking system.* Each vehicle that does not have a parking brake system that is automatically applied in the event of air pressure loss shall have a parking brake system conforming to S5.6 that is capable of manual application at any reservoir system pressure level, and shall have an emergency braking system that meets the following requirements.

TABLE IV

Series	Snubs	Snub conditions (highest speed specified in miles per hour)
1	175	40-20
2	25	45-20
3	25	50-20
4	25	55-20
5	250	60-20

S5.7.2.1 *Emergency braking control.* The emergency braking system shall be controlled by the service brake control or the parking brake control. The control for the emergency braking system shall control the brakes on any towed vehicle equipped with air brakes.

S5.7.2.2 *Emergency braking system failure.* In the event of a failure of a valve, manifold, brake fluid

housing, or brake chamber housing that is common to the service brake and emergency braking systems, loss of air shall not cause the parking brake to be inoperable.

S5.7.2.3 *Emergency braking stopping distance.* Except as specified in S5.7.2.3.1 and S5.7.2.3.2, when stopped six times for each combination of weight and speed specified in S5.3.1.1 on a road surface with a skid number of 75, with a single failure in the service brake system of a part designed to contain compressed air or brake fluid (except failure of a common valve, manifold, brake fluid housing, or brake chamber housing), the vehicle shall stop at least once in not more than the distance specified in column 3 of Table II, measured from the point at which movement of the brake control begins, without any part of the vehicle leaving the roadway, except that a truck-tractor tested at its unloaded vehicle weight plus 500 pounds shall stop at least once in not more than the distance specified in Column 4 of Table II.

S5.7.2.3.1 A truck manufactured before September 1, 1976, that has a front steerable non-driving axle with a GAWR of 16,000 pounds or more, or a front steerable drive axle with a GAWR of less than 18,000 pounds, and a truck manufactured before September 1, 1975, that has a front steerable drive axle of any GAWR, must stop in accordance with S5.7.2.3 without any part of the vehicle leaving the roadway, but need not stop in the distances specified.

S5.7.2.3.2 When stopped in accordance with S5.7.2.3, a truck or bus manufactured before September 1, 1975, other than a truck described in S5.7.2.3.1, shall stop at least once for each speed and weight condition on a surface with a skid number of 75 in not more than the distance specified in Table IIa, instead of meeting the stopping distances specified in Table II for stops on a surface with a skid number of 75.

Effective date. September 1, 1976.

S5.7 *Emergency brake system-trucks and buses.* Each vehicle shall be equipped with an emergency brake system which, under the conditions of S6.1, conforms to the requirements of S5.7.1 through S5.7.3. The emergency brake system may be a part of the service brake system or incorporate portions of the service brake and parking brake systems.

S5.7.1 *Emergency brake system performance.* When stopped six times for each combination of weight and speed specified in S5.3.1.1 on a road surface with a skid number of 75 with a single failure in the service brake system of a part designed to contain compressed air or brake fluid (except failure of a common valve, manifold, brake fluid housing, or brake chamber housing), the vehicle shall stop at least once in not more than the distance specified in Column 3 of Table II, measured from the point at which movement of the service brake control begins, without any part of the vehicle leaving the roadway, except that a truck-tractor tested at its unloaded vehicle weight plus 500 pounds shall stop at least once in not more than the distance specified in Column 4 of Table II.

S5.7.2 *Emergency brake system operation.* The emergency brake system shall be applied and released, and be capable of modulation, by means of the service brake control.

S.5.7.3 *Towing vehicle emergency brake requirements.* In addition to meeting the other requirements of S5.7, a vehicle designed to tow another vehicle equipped with air brakes shall—

(a) In the case of a truck-tractor in the unloaded condition and a single unit truck which is capable of towing an air-brake equipped vehicle and is loaded to gross vehicle weight rating, be capable of meeting the requirements of S5.7.1 by operation of the service brake control only, with the trailer air supply line and air control line from the towing vehicle vented to the atmosphere in accordance with S6.1.14;

(b) In the case of a truck-tractor loaded to gross vehicle weight rating, be capable of meeting S5.7.1 by operation of the service brake control only, with the air control line from the towing vehicle vented to the atmosphere in accordance with S6.1.14; and

(c) Be capable of modulating the air in the supply or control line to the trailer by means of the service brake control with a single failure in the towing vehicle service brake system as specified in S5.7.1.

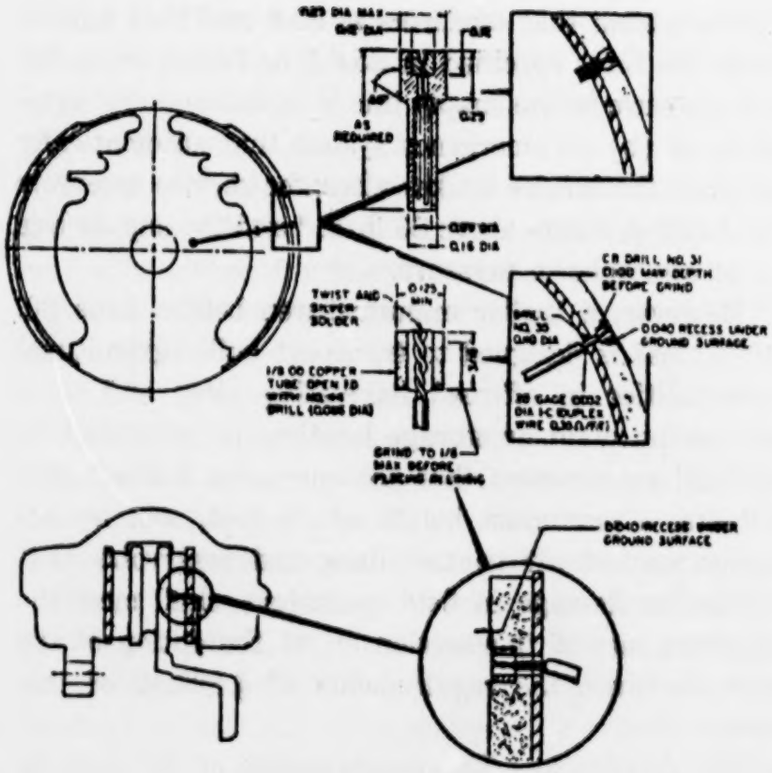


FIG. 2

THERMOCOUPLE INSTALLATION

S5.8 *Emergency braking capability-trailers.* Each trailer other than a trailer converter dolly shall have a parking brake system that conforms to S5.6 and that applies with the force specified in S5.6.1 or S5.6.2 when the air pressure in the supply line is at atmospheric pressure. A trailer converter dolly shall have, at the manufacturer's option, (a) a parking

brake system that conforms to S5.6 and that applies with the force specified in S5.6.1 or S5.6.2 when the air pressure in the supply line is at atmospheric pressure, or (b) an emergency system that automatically controls the service brakes when the service reservoir is at any pressure above 20 lb/in^2 and the supply line is at atmospheric pressure.

However, a trailer manufactured before June 30, 1976, that is designed to transport bulk agricultural commodities in off-road harvesting sites and to a processing plant or storage location, as evidenced by skeletal construction that accommodates harvest containers, a maximum length of 28 feet, and an arrangement of air control lines and reservoirs that minimizes damage in field operations, shall meet the requirements of this section or, at the option of the manufacturer, the requirements of § 393.43 of this title.

S6. *Conditions.* The requirements of S5 shall be met under the following conditions. Where a range of conditions is specified, the vehicle must be capable of meeting the requirements at all points within the range.

S6.1 *Road test conditions.*

S6.1.1. Except as otherwise specified the vehicle is loaded to its gross vehicle weight rating, distributed proportionately to its gross axle weight ratings.

S6.1.2 The inflation pressure is as specified by the vehicle manufacturer for the gross vehicle weight rating.

S6.1.3 Unless otherwise specified, the transmission selector control is in neutral or the clutch is disengaged during all decelerations and during static parking brake tests.

S6.1.4 All vehicle openings (doors, windows, hood, trunk, cargo doors, etc.) are in a closed position except as required for instrumentation purposes.

S6.1.5 The ambient temperature is between 32°F. and 100°F.

S6.1.6 The wind velocity is zero.

S6.1.7 Stopping tests are conducted on a 12-foot wide level roadway having a skid number of 75, unless otherwise specified. The vehicle is alined in the center of the roadway at the beginning of a stop.

S6.1.8 The brakes on a vehicle manufactured before September 1, 1976, are burnished before testing, at the manufacturer's option, in accordance with S6.1.8.1 or S6.1.8.2. The brakes on a vehicle manufactured on or after September 1, 1976, are burnished before testing in accordance with S6.1.8.1. However, for vehicles with parking brake systems not utilizing the service brake friction elements, burnish the friction elements of such systems prior to the parking brake test according to the manufacturer's recommendations.

S6.1.8.1 With the transmission in the highest gear appropriate for the series given in Table IV make 500 brake applications at a deceleration rate of 10 ft/s/s, or at the vehicle's maximum deceleration rate, if less than 10 ft/s/s, in the sequence specified in Table IV.

After each brake application, accelerate to the speed specified and maintain that speed until making the next brake application at a point 1 mile from the initial point of the previous brake application. If a vehicle cannot attain the specified speed in 1 mile, continue to accelerate until the specified speed is reached or until the vehicle has traveled 1.5 miles from the initial point of the previous brake application. If during any of the brake applications specified in Table IV, the hottest brake reaches 500°F, make the remainder of the 500 applications from that snub condition except that a higher or lower snub condition shall be used as necessary to maintain an after-stop temperature of 500°F. ± 50°F. Any automatic pressure limiting valve is in use to limit pressure as designed, except that any automatic front axle pressure limiting valve is bypassed if the temperature of the hottest brake on a rear axle exceeds the temperature of the hottest brake on a front axle by more than 125°F. A bypassed valve is reconnected if the temperature of the hottest brake on a front axle exceeds the temperature of the hottest brake on a rear axle by 100°F. After burnishing, adjust the brakes as recommended by the vehicle manufacturer.

S6.1.8.2 With the transmission in the highest gear range appropriate for 40 mph, make 400 brake applications from 40 mph to 20 mph at 10 ft/s/s. After each brake application accelerate to 40 mph and maintain that speed until making the next application at a point 1.5 miles from the point of the previous

brake application. After burnishing, adjust the brakes as recommended by the vehicle manufacturer.

S6.1.9 Static parking brake tests for a semitrailer are conducted with the front-end supported by an unbraked dolly. The weight of the dolly is included as part of the trailer load.

S6.1.10. In a test other than a static parking brake test, a truck-tractor manufactured before September 1, 1976, is tested at its gross vehicle weight rating by loading it without a trailer or, at the manufacturer's option, by coupling it to a flatbed semitrailer (hereafter, control trailer) as specified in S6.1.10.1 to S6.1.10.7. In a test other than a static parking brake test, a truck-tractor manufactured on or after September 1, 1976, is tested at its gross vehicle weight rating by coupling it to a control trailer as specified in S6.1.10.1 to S6.1.10.7.

S6.1.10.1 The control trailer conforms to this standard.

S6.1.10.2 The center of gravity of the loaded control trailer is on the trailer's longitudinal centerline at a height of 66 ± 3 in. above the ground.

S6.1.10.3 For a truck-tractor with a rear axle gross axle weight rating of 26,000 lb. or less, the control trailer has a single axle with a gross axle weight rating of 18,000 lb. and a length, measured from the transverse centerline of the axle to the centerline of the kingpin, of 258 ± 6 in.

S6.1.10.4 For a truck-tractor with a total rear axle gross axle weight rating of more than 26,000 lb.

the control trailer has a tandem axle with a combined gross axle weight rating of 32,000 lb. and a length, measured from the transverse centerline between the axles to the centerline of the kingpin, of 390 ± 6 in.

S6.1.10.5 The control trailer is loaded so that its axle is loaded to its gross axle weight rating and the tractor is loaded to its gross vehicle weight rating, with the tractor's fifth wheel adjusted so that the load on each axle measured at the tire-ground interface is most nearly proportional to the axles' respective gross axle weight ratings.

S6.1.10.6 *Test equipment specification.* The control trailer's service brakes are capable of stopping the combination from the maximum speed at which the tractor is tested, under the conditions of S6.1, without assistance from the tractor brakes, in the distance found by multiplying the value 68, 90, 115, 143, 174, 208, or 245 (corresponding to a speed of 30, 35, 40, 45, 50, 55, or 60 mph as appropriate for the truck-tractor tested) by the ratio:

$$\frac{\text{weight on all axles of combination}}{\text{weight on trailer axles}}$$

with the tractor's fifth wheel adjusted as specified in S6.1.10.5, the trailer service reservoirs pressurized to 100 lb/in², and the trailer loaded so that its axle is at gross axle weight rating and its kingpin is at empty vehicle weight. The stopping distance is measured from the point at which movement of the valve controlling the trailer brakes begins. The service brake

chambers on the trailer reach 60 lb/in² in not less than 0.20 second and not more than 0.30 second, measured from the instant at which movement of the valve controlling the trailer brakes begins.

S6.1.10.7 *Test equipment specification.* The control trailer's emergency brakes are capable of stopping the combination under the conditions of S6.1 from the maximum speed at which the tractor is tested, without assistance from the tractor's brakes, in the distance found by multiplying the emergency brake stopping distance in column 3 of Table II by the ratio:

$$\frac{\text{weight on all axles of combination}}{\text{weight on trailer axles}}$$

with the combination loaded in accordance with S6.1.10.5. Stopping distance is measured from the point at which movement of the valve controlling the trailer brakes begins. In the case of control trailers that utilize parking brakes for emergency stopping capability, the pressure in the trailer's spring parking brake chambers falls from 95 lb/in² to 5 lb/in² in not less than 0.50 second and not more than 0.60 second, measured from the instant at which movement of the valve controlling the trailer's spring parking brakes begins.

S6.1.11 *Special drive conditions.* A vehicle equipped with an interlocking axle system or a front wheel drive system that is engaged and disengaged by the driver is tested with the system disengaged.

S6.1.12 *Liftable axles.* A vehicle with a liftable axle is tested at gross vehicle weight rating with the liftable axle down and at unloaded vehicle weight with the liftable axle up.

After September 1, 1975, the trailer test rig shown in Figure I is capable of increasing the pressure in a 50 cubic inch reservoir from atmospheric to 60 lb/in² in 0.06 second, measured from the first movement of the service brake control to apply service brake pressure and of releasing pressure in such a reservoir from 95 to 5 lb/in² in 0.22 second measured from the first movement of the service brake control to release service brake pressure.

Effective date. September 1, 1976.

S6.1.14 In testing the emergency braking system of towing vehicles under S5.7.3(a) and S5.7.3(b), the hose(s) is vented to the atmosphere at any time not less than 1 second and not more than 1 minute before the emergency stop begins, while the vehicle is moving at the speed from which the stop is to be made and any manual control for the towing vehicle protection system is in the position to supply air and brake control signals to the vehicle being towed. No brake application is made from the time the line(s) is vented until the emergency stop begins and no manual operation of the parking brake system or towing vehicle protection system occurs from the time the line(s) is vented until the stop is completed.

S6.2 *Dynamometer test conditions.*

S6.2.1 The dynamometer inertia for each wheel is equivalent to the load on the wheel with the axle loaded to its gross axle weight rating.

S6.2.2 The ambient temperature is between 75°F. and 100°F.

S6.2.3 Air at ambient temperature is directed uniformly and continuously over the brake drum or disc at a velocity of 2,200 feet per minute.

S6.2.4 The temperature of each brake is measured by a single plug-type thermocouple installed in the center of the lining surface of the most heavily loaded shoe or pad as shown in Figure II. The thermocouple is outside any center groove.

S6.2.5 The rate of brake drum or disc rotation on a dynamometer corresponding to the rate of rotation on a vehicle at a given speed is calculated by assuming a tire radius equal to the static loaded radius specified by the tire manufacturer.

S6,2.6 Brakes are burnished before testing as follows: Place the brake assembly on an inertia dynamometer and adjust the brake as recommended by the brake manufacturer. Make 200 stops from 40 m.p.h. at a deceleration of 10 f.p.s.p.s., with an initial brake temperature on each stop of not less than 315°F. and not more than 385°F. Make 200 additional stops from 40 m.p.h. at a deceleration of 10 f.p.s.p.s. with an initial brake temperature on each stop of not less than 450°F. and not more than

550°F. After burnishing, the brakes are adjusted as recommended by the brake manufacturer.

S6.2.7 The brake temperature is increased to a specified level by conducting one or more stops from 40 m.p.h. at a deceleration of 10 f.p.s.p.s. The brake temperature is decreased to a specified level by rotating the drum or disc at a constant 30 m.p.h.

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